

The Scientific Interest of Friedrich von Hardenberg (Novalis)

LYDIA ELIZABETH WAGNER

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By

LYDIA ELIZABETH WAGNER

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IN ACKNOWLEDGMENT

New interest in the broad range of study which characterized some of the Early German Romantists was roused in the stimulating seminar of Professor Edward V. Brewer at the University of California. Out of this interest my Novalis study grew. Professor George R. Potter, also of the University of California, did much to direct the course of this investigation. I wish to thank Professor Fred B. Wahr of the University of Michigan for the encouraging interest he took in my study. To Professor John W. Scholl, of this same university, however, I owe grateful acknowledgment for the many kind suggestions and the untiring help he gave me.

L. E. W.

TABLE OF CONTENTS

	Page
Introduction	ix
Biographical Sketch.	1
Early Years and University Life.	13
Tennstedt - Weissenfels Period	17
Life at Freiberg	28
Last Years in Weissenfels.	64
Conclusion	95
Bibliography	105

· INTRODUCTION

When Friedrich von Hardenberg (Novalis) died in 1801, he left an immense amount of unpublished manuscript material. Some of it was unfinished. It was not in any arranged form. Much of it was not ready for publication.

Contemporaries brought out editions of his poetic work and selected fragments. Friedrich Schlegel and Ludwig Tieck first brought out Novalis' Schriften in 1802; Ludwig Tieck and Eduard von Bülow an enlarged edition in 1846.

Then just one hundred years after his death, in 1901, a new edition of Novalis' works by Ernst Heilborn came out. In preparing this new edition Heilborn had attempted to arrange chronologically the "Fragmente" which he felt were worthy of publication. He had tried to differentiate between youthful and more mature works. The Jakob Minor edition appearing in 1907, again turned away from any attempt at chronological order. This editor arranged the poetic material in formal groups by content. He reproduced those collections of "Fragmente" which Novalis had published, and also the selections made by the contemporaries, Friedrich Schlegel and Ludwig Tieck and Eduard von Bülow. The Minor edition stressed all-inclusiveness as to poetic material, and disregarded some of Heilborn's additional material, excluding parts of the "Studienhefte," valuable book-lists, etc. Later editions were based more or less closely on the editions of Heilborn and Minor.

All editions have, however, been superseded by that of Professor Kluckhohn, which appeared in 1929. From the mass of unpublished manuscript

material, Professor Kluckhohn has augmented greatly the fragments published earlier by the various editors. The now extensive published fragmentary material is also chronologically arranged. The correspondence is revised and amplified. The texts are improved. Moreover, Dr. Richard Samuel, who helped in the preparation of this edition, published valuable new documents in connection with his article, "Der berufliche Werdegang Friedrich von Hardenbergs." These documents are found in the official transactions recorded by superior officers of the salt-works, and in public records in Dresden.

Therefore, there is now available much more of Novalis' extensive posthumous work, than there was when the first studies of Novalis and his work were made.

Several studies have been made of Novalis and his relationship to science. Almost universally Friedrich von Hardenberg has been subjected to the severe criticism that his studies in the field of natural science show lack of scientific thought. W. Olshausen in his dissertation, Friedrich v. Hardenberg^s (Novalis) Beziehungen zur Natur = wissenschaft seiner Zeit (1901), reached the conclusion that Novalis was not able to undertake a philosophical treatment of the conclusions and problems of the investigations of his time in this field. This inability was due, according to his interpretation, to Novalis' failure to penetrate with sufficient discernment into empirical realities of natural science.

A more recent investigation by Dr. Friedrich Borden, "Die deutsche Romantik und die Wissenschaft" (1930), confirms this verdict, that the Romantic thinker could not think a thing through logically and methodically. Dr. Borden believes that there is complete lack of any conception of what scientific

investigation entails. He makes a very general statement, that nothing was so foreign to the Romantic mind as patience for strictly methodical thought and investigation.

However, in a study made by Käte Hamburger, "Novalis und die Mathematik - Eine Studie zur Erkenntnistheorie der Romantik" (1929), Novalis has been shown to give evidence of logical, constructive combinations of ideas, which led him toward goals partially realized by investigators during the following century. And Kreisamtmann Just, Novalis' first biographer, had written that the young man did nothing superficially which he undertook, that he evaded no demands, no tasks, exacting and difficult and exhausting though they may have been. The co-worker of Professor Kluckhohn, Dr. Richard Samuel, in his article emphasizes the significance of Novalis' practical vocational activity for his entire development, for all his work as poet and thinker. It is truly amazing to see how much practical application resulted from Novalis' technical and scientific studies during a very short time.

Olshausen's estimate of Novalis' relationship to the natural sciences of his time is a biased one.¹ He based his study on limited fragment material, which he approached from a logical, causal standpoint. Speculative "Geschichtswissenschaft" and "Geisteswissenschaft" became the whole of science for Dr. Friedrich Borden. Both of these investigators studied Novalis and his relationship to natural science in the light of their own times. Novalis' interest in this field should be considered in the light of his own day.

Since the Kluckhohn edition has made available much additional material for investigation, and

1. Olshausen does, however, give a helpful discussion of the development of science, which was used in this study.

since the material is now arranged in chronological order, it is possible to approach any Novalis problem with better hope of its solution.

It is proposed in this study to attempt a full presentation of Novalis' relation to all the science of his time throughout his brief life, excepting mathematics, which has been fully covered by Käte Hamburger,² and determine as definitively as possible the role of the sciences in his life and art, without applying unfairly criteria of judgment unknown to the intellectual world of his day.

2. There appeared in 1934 a monograph by Karl Theodor Bluth, Medizingeschichtliches bei Novalis (cf. Bibliography), which however, is based on limited Novalis-material. This investigator does not take into account some of the more recent studies and the additional available Novalis-material, which have modified our approach to any Novalis study.

BIOGRAPHICAL SKETCH*

Friedrich von Hardenberg, born May 2, 1772, in Wiederstedt lived only a very short life. At the age of 29 years, he died in Weissenfels on March 25, 1801. He had been a delicate, quiet child, but after a serious illness during his ninth year, he showed remarkable ability and eager curiosity. Life at the Luthergymnasium in Eisleben for a few months in 1790 brought him close and stimulating contact with the capable pedagogue Rektor Jani.¹ Due to the untimely death of his teacher, Novalis found himself transferred to the University at Jena in October of the same year. Jurisprudence was his field of study. Two other subjects, however, held greater attraction for him. The philosopher Reinhold,² teacher of Kantian philosophy, roused interest in the young student, and Schiller's historical lectures intensified his already unusual eagerness in reading history.³ One year later Novalis went to Leipzig. In addition to his lectures in law, he heard lectures in the field of mathematics and natural science. When he left this university after three semesters, the friendship with Friedrich Schlegel was well sealed. At Wittenberg Novalis quickly and ably completed his

*Based on the discussion by Professor Paul Kluckhohn--
"Friedrich von Hardenbergs Entwicklung und Dichtung"--
Novalis' Schriften (Kluckhohn), Bd. 1, S. 9*ff.

1. David Christ. Jani (1743-1790); Director of the Luthergymnasium in Eisleben, renowned schoolman and editor of Horace.
2. Karl Leonh. Reinhold (1758-1823).
3. Booklist shows this--Novalis' Schriften (Kluckhohn), Bd. 4, S.471 ff. Ludwig Tieck also speaks of the fact--cf. Novalis' Schriften, Bd. 4, S.450.

work. He went there in 1793. He is described as being at that time a young man with a serious desire to develop a practical method of thought, as being a young man with a wide range of interests. With equal intensity he was giving his attention to agriculture, to technical achievements and scientific progress, to architecture and gardening, to libraries and governmental conditions, to social life and beauties of the landscape.

As a young man, open and practical of mind, Novalis began the application of his knowledge.⁴ Following the wish of his father, he was to be admitted to administrative work in Tennstedt in Thüringen. In October of the year 1794 he took up his duties as clerk of that district. The district-bailiff Just,⁵ who was to supervise Novalis' training, soon became his friend and after his early death his first biographer. The profession for which Novalis was preparing himself in Tennstedt was not his own choice, and yet he could devote himself to his duties and responsibilities with all seriousness and without the tendency to shun professional activity, which is generally attributed to all "romanticists," because he saw in his work a means of self-development and knew how to exalt any insignificant occupation. His work later in the salt-mines too was merely a part of a greater work. Conscientiously and painstakingly he did his work, but still found time and strength to give to additional intellectual activity. During these years, 1795-1796, it was the Fichtean philosophy he was seeking to comprehend. The same years gave Novalis Sophie von Kühn and the love which left such deep imprints in his soul. The thirteen-year old Sophie became his betrothed in the spring of 1795. It is true, as Professor Kluckhohn wrote,⁶ that it must remain an unexplained secret, just what there was in

4. Kluckhohn--Novalis' Schriften, Bd. 1, S.18*.

5. August Cölestin Just (1750-1822).

6. Novalis' Schriften (Kluckhohn), Bd. 1, S.23*.

this love, that had so tremendous an effect on Novalis. It meant for him transformation and clarification of his whole being, strengthening of his whole character and fixing of his vocation. After two years, in March of 1797, she died. This episode was to be the most vital experience of his life and have far-reaching effects. The whole of Novalis' mature poetical work had its roots in this experience, and his whole philosophy of life was colored by it. In 1797, however, poetry was not yet Novalis' main interest. Because of his sorrow, he plunged himself with increased absorption into scientific studies. Studies in abstract sciences were pursued, with the Dutch philosopher Hemsterhuis⁷ holding an especial appeal. Much that Novalis read and studied, the ideas that arose in his mind in connection with stimulating material were now reflected in the so-called "Fragmentenhefte" and "Studienhefte," just as his interests had come to the fore earlier in the "Studien" and "Bemerkungen." Professor Kluckhohn calls the extent of his studies, the abundance of ideas expressed, and the variety of intellectual fields touched, simply stupendous. These fragments were not intended for publication. Only a small selection was prepared for the Athenäum in 1789. In this collection, appearing under the title Blütenstaub, mystical fragments predominate.

Even though Novalis, during all the remaining years of his life, kept this interest for the mystical --for the teachings of Jakob Böhme⁸ and Plotinus,⁹ of

7. Franz Hemsterhuis (1721-90); Dutch philosopher and archaeologist.

8. Jakob Böhme (1575-1624).

9. Plotinus (Plotin) (205-270 A.D.).

Hemsterhuis and Eckartshausen¹⁰--even though "der Blick nach innen" colored all his life and thinking, nevertheless, Novalis did not forget the necessary "Blick nach aussen," the effective, spontaneous, conscious observation of the external world. While his thoughts of the mystic were being voiced in the "Blütenstaub" fragments, he was writing "die Lehrlinge zu Sais," itself fragmentary, in order to express his ideas of nature. Another fragment considered the question of religion.¹¹ Besides the small selection of the "Blütenstaub" fragments, Novalis published only one other group called "Glauben und Liebe," rather complete in itself, devoted to only one sphere of thought, that of the state and the ruler. Early in 1789 he was occupied with two other series which were to have appeared under the titles, "Logologische Fragmente" and "Poetizismen," philosophic fragments and thoughts concerning poetry. The manuscripts which contained this material, and also the notations following them gradually, however, occupied themselves more and more with other thoughts and ideas as well. Physiological comments analyzing Brown's¹² theories, psychological, aesthetical, ethical, and linguistic annotations, and observations concerning practical, every-day life found their place in this fragment-material.

For two reasons Novalis decided toward the end of 1797 to carry on study in the natural sciences, geology especially, at the University of Mining at Freiberg. As administrator of salt-works he wished to have what seemed to him the necessary scientific

10. K. v. Eckartshausen (1752-1803). Published the following: Die neuesten Entdeckungen über Licht, Wärme und Feuer für Liebhaber der Physik und Chemie (1798-1801); Ideen über das affirmative Prinzip des Lebens (1798); Ideen über das negative Prinzip des Todes (1798).

11. Novalis' Schriften (Kluckhohn) Bd. 1, S.28*.

12. John Brown (1735-88); Scotch physician and investigator.

and technical knowledge. That was the practical reason. After the death of Sophie, Novalis had plunged himself into the study of the abstract sciences, now unrest in his soul drove him back to the natural sciences which were not new to him. The chemist Wiegleb¹³ had been his teacher at Langensalza in chemistry and halurgy.¹⁴ At Freiberg Abraham Gottlob Werner¹⁵ became his master. Werner was just then at the height of his career. Students from everywhere were gathering about him to be instructed in the new sciences, geognosy and oryktognosy, the science of the inner structure of the earthly globe and the science of distinguishing the minerals. Werner tried to do for minerals what Linneus had done for plants. Werner's whole plan to systematize and classify all minerals was based on the fundamental Neptunian¹⁶ theory, recognized and accepted by Goethe too, but soon proven to be erroneous. Friedrich von Hardenberg, as many another enthusiast, was tremendously attracted to this man Werner. The teacher in Die Lehrlinge zu Sais and the miner in Heinrich von Ofterdingen are monuments to him. Along with the geological and mineralogical studies, Novalis took up physics, mathematics, and chemistry. For all these subjects he kept "Studienhefte" in which he kept excerpts from scientific literature and lectures. These excerpts Novalis called "Materialien," and added accompanying "Bemerkungen."

13. Joh. Christian Wiegleb (1732-1800); Druggist and chemist in Langensalza, well-known author of the following works: Historisch-kritische Untersuchungen der Alchymie und eingebildeten Goldmacherkunst (1777); Handbuch der allgemeinen und angewandten Chemie (1781); Lehrbegriff vom Phlogiston (1785). Novalis studied with him in January, 1796.

14. Halurgy is the "science" of the preparation of cooking-salt.

15. (1749-1817); Professor of mining and mineralogy.

16. Geologists at this time were divided into two opposed camps. One group, called Plutonists, were the followers of James Hutton, and stressed the potency of the internal fire of the earth. The opposing group, called Neptunists, were the disciples of Werner, and stressed the importance of a primeval ocean.

The last decade of the eighteenth century was for the natural sciences a period of great discoveries and bold hypotheses. Up through the very last decades of the eighteenth century the term "natural philosophy" was still being applied generally to any inquiry of a chemical or physical nature. Dr. Priestley's discovery of oxygen¹⁷ formed a new nucleus about which further chemical investigation could be grouped. Lavoisier demonstrated the true nature of combustion and made of chemistry an exact empirical science. In Germany Richter¹⁸ and Alexander von Humboldt¹⁹ and Reil²⁰ were continuing on the new scientific basis. However, only gradually came a strict differentiation of the physical sciences. The problem of the processes of life and that of the unity of organic and inorganic matter was in the foreground. The science of comparative physiology arose. The concepts of sensibility and irritability, formulated by Albrecht von Haller,²¹ were playing an important role in the question of the inherent characteristics of an organism. The Scottish physician, John Brown, wanted to make one concept, that of irritability or excitability, the fundamental idea for the whole science of medicine. Life to him meant ability to react to stimulation. Illness resulted from an excessive tendency to excitability, or from too slight susceptibility to excitability. Through Andreas Röschlaub,²² a physician in Bamberg, this theory became widespread in Germany during the last years of the century. Among other discoveries

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17. In spite of the fact that Priestley upheld the doctrine of phlogiston until his death, he was nevertheless the real discoverer of the new element oxygen, although he did not recognize it as such.
 18. Jeremias Benjamin Richter (1762-1807); Chemist in Breslau, author of Anfangsgründe der Stöchiometrie oder Messkunst chemischer Elemente (1792-1793); Über die neuern Gegenstände in der Chemie (1791-1802).
 19. (1769-1859).
 20. Johann Christian Reil (1759-1813); German anatomist.
 21. (1708-1777).
 22. (1768-1835).

in the domain of the physical sciences which gave new impetus to physiology was Galvani's discovery of an electrical force in the animal organism. Volta carried on further investigations of this so-called Galvanic phenomenon. Into the resulting controversy, the young physicist at Jena, Johann Wilhelm Ritter²³ entered. In the introduction of his book, Beweis dass ein beständiger Galvanismus den Lebensprozess in dem Tierreich begleite, Ritter spoke of Galvani's discovery in the following way:

Es ist allgemein bekannt, dass seit sieben Jahren eine der grössten physiologischen Entdeckungen die Aufmerksamkeit aller Naturforscher auf sich zog--ich meine die von Galvani,..... gemachte, über die sogenannte thierische Elektrizität.²⁴

This young investigator, as a result of the difficult electrical and magnetic experiments which he carried on so successfully, has been acclaimed as the founder of electro-chemistry. It was, however, not until 1820, that the Danish physicist, Hans Christian Oersted, demonstrated the intimate correlation between electricity and magnetism, and it remained for Sir Humphrey Davy²⁵ to establish the foundations of the present-day science of electro-chemistry. Novalis knew Ritter's writings and knew the man. Ritter's book, Fragmente aus dem Nachlasse eines jungen Physikers (1810), commemorates the genuine, enduring friendship existing between the two. Franz von Baader²⁶ and the Norwegian, Henrik Steffens,²⁷ were two other investigators of "nature" who held for a time the enthusiastic admiration of Novalis.

23. (1776-1810).

24. S. VII.

25. (1778-1829).

26. (1765-1841); Dissertation: Vom Wärmestoff (1786); Über das pythagoräische Quadrat in der Natur (1798); Beiträge zur Elementarphysiologie (1797).

27. (1773-1845).

With unbounded zeal Novalis is said to have worked at his studies in Freiberg. In some fields of study he remained mere amateur, in others he was capable of doing independent work as "das allgemeine Brouillon," dating from that period, shows. "Das allgemeine Brouillon" was the title Novalis later gave to a large part of his general notebook material. Remarkable is the diversity of sciences to which he gave thought. Physiology and geology can be said to have held the foreground. Then there were sociology, psychology and mathematics, philosophy, history and archaeology, philology, cosmology, and occult science. All of these he wished in the end to knit together, so that he might realize a whole, one science. A comprehensive encyclopaedic work was to lead to this result. Intensive though Friedrich von Hardenberg's scientific and technical studies at Freiberg were, speculative thought still occupied his mind. The last months of his Freiberg stay were, however, taken up largely by metallurgy. In the spring of 1799 Novalis returned to his administrative work in Weissenfels. He made many official tours, and was able, due to his real knowledge of mining, to present thorough discerning reports and to make intelligent proposals for the improvement of the Saxon mines and salt-works. The board of management also gave credit to him for the fine tact and keen insight shown in regard to questions relating to staff and employees.

During Novalis' stay in Freiberg, he had again become engaged. Julie Charpentier was the daughter of his superior, the head manager of mines. From May, 1799 on, Weissenfels remained the poet's place of residence, although official trips took him to Artern, Kösen, and other places where there were salt-works and mines. In Dresden, to which city Novalis had often gone while in Freiberg, he associated with the Schlegels and Schelling and Joh. Diedr. Gries.²⁸ From Weissenfels he often went to

28. (1775-1842); Translator.

Jena where the Schlegels and Schelling now also resided. Here were also Ritter and Ludwig Tieck and Steffens. From now on all the time which was left after his professional duties were completed, was devoted to poetic writing. There had been earlier poems, and thoughts expressed concerning poetry, also the fragment Die Lehrlinge zu Sais from the beginning of the year 1798. However, his efforts in natural science and his speculative studies gave him little time for creative poetic work in Freiberg. Die Lehrlinge zu Sais remained a fragment now that the novel Heinrich von Ofterdingen was begun. It was the summer of 1799 which marked the beginning of Friedrich von Hardenberg's greatest lyric activity. Die Hymnen an die Nacht and Die geistlichen Lieder were written, as well as the lyrics later inserted in Heinrich von Ofterdingen. Closely related to "die Hymnen" and "die geistlichen Lieder" in thought is the poetic essay Die Christenheit oder Europa. It is, however, the unfinished novel Heinrich von Ofterdingen which climaxes Novalis' poetic development. In addition to these purely poetic expressions, Novalis was again supplementing his poetic work with "Fragmente" and "Tagebücher." In these, poetry and religion predominate over philosophy, and his own illness turned him again to Dr. Brown and his experiments. In October, 1800, the notations ceased. The illness against which he had been struggling grew worse. He was at the beginning of a very promising professional career, and looking forward to completing tremendous poetic plans when he died in March of the year 1801.

The most important editions of Novalis' works before the recent Kluckhohn edition appeared, were two editions by contemporaries and two more recent editions. Friedrich Schlegel and Ludwig Tieck first brought out Novalis Schriften in 1802, then Ludwig Tieck and Eduard v. Bülow added a third part to Novalis Schriften in 1846. The edition by Ernst Heilborn came out in 1901, and that of Jakob Minor

in 1907. The later editions are based more or less on these two. Among the various editions may be mentioned that of Ernst Kamnitzer (1924). The Kluckhohn edition²⁹ (1929) is described as an edition "nach den Handschriften ergänzt und neugeordnet." It also goes back to the Heilborn and Minor editions, but undertakes to bring new order into Novalis' extensive posthumous works, to increase considerably available publishable material, and to present improved texts. Heilborn had attempted to arrange the "Fragmente" chronologically and to differentiate between youthful and mature works. Minor turned away from any chronological attempt, arranging the poems in formal groups as to content. In the two Minor volumes of "Fragmente," the collections given are in the form in which Novalis himself published them, or as selected by Friedrich Schlegel and Eduard von Bülow, thus again segregating the additional material added by Heilborn. Professor Kluckhohn goes back to Heilborn's chronological principle, carrying it through with a keener critical sense³⁰ and adding more material from manuscripts. Fragment-material has real importance only when the relationship with other notations is evident, and when we know the time it was written. Arranged according to time, fragmentary notations permit a study of the development of the poet's mode of viewing things, as well as a study of the change of interests. Letters of Novalis are given in collected form, to which Professor Kluckhohn adds letters to Novalis also. A well-arranged collection of "Tagebücher" and personal notes is followed by a group of remarks made by friends of

29. Im Verein mit Richard Samuel herausgegeben.

30. Eduard Havenstein's study Friedrich v. Hardenbergs ästhetische Anschauungen Verbunden mit einer Chronologie seiner Fragmente, appearing in 1909, is pointed out by Kluckhohn as very valuable, since Havenstein was the first to observe the change in the characters of Novalis' handwriting, and use this change as an important point to place definitely various parts of the material as to the date when written.

the poet. Such remarks help to throw considerable light on the poet's personality.

We have then various types of material on which to base an estimate of Novalis. The poet himself spoke of fragments, letters, poems, strictly scientific treatises or reports as very possibly written in distinctly different manner.³¹ Once he wrote: "Briefe sollen Erholungen sein, und ich sollte sie auch als solche für mich bearbeiten..."³² But on the other hand in Das allgemeine Brouillon, we find this statement:

Briefe, Unterhaltungen--oder Gespräche--
Geschäftsarbeiten--Wirksame Broschüren--das sind
praktisch schriftstellerische Arbeiten..... Romane,
Erbauungsbücher, Komödien, etc., selbst historische
und philosophische Arbeiten, sobald sie nicht als
Geschäftsarbeiten, Berichte, Protokolle, etc., be-
trachtet werden können--sind bloss gefällige,
liebenswürdige, schriftstellerische Arbeiten.³³

The purpose of the letter, or whatever the form of the literature may be, then determines to a large degree how the matter is to be interpreted. There are personal and business letters, letters of petition to superiors, and letters presenting professional reports. Of the occasional impromptu letter-writer we do not expect a conscious form, such as we do look for in formal official letters. And Novalis does present facts in his reports in a thorough and logical way. He gives to his chief detailed observations, causes and results and practical suggestions, clearly and carefully thought out. We find here precise, finished statements, almost a terse style. The other letters, written in what Novalis generally termed "eine poetische Form," were during the earlier years

31. Novalis' Schriften (Kluckhohn), Bd.3, S.249, 948.

32. Ibid., S.116, 341, and Bd.4, S.400.

33. Ibid., Bd.3, S.263, 1070.

quite "formless." Letters seeking to express upheavals of a growing soul, overwhelming experiences of youth, and stirring thoughts, naturally breathed of over-enthusiasm and disconnected thinking. Even these letters, however, later were influenced by his objective professional work. In his letters Novalis expressed himself to friends and associates. In his "Tagebücher" he talked to himself, and there probably exposed his innermost being most definitely. The "Fragmente" also are "daily" reflections and meditations, but in a wider sense. They are part of what we can call Novalis' scientific or scholarly work, which for the most part is composed of just such material, variously designated as "Blätter," "Hefte," "Studien," "Notizen," "Fragmente." The poetic work of Novalis is a comparatively small part of the whole, and a very short space of the poet's life was taken up by it. It is the fragmentary material which contains such a fund of varied thought, and which represents Novalis' greatest--what we may call--literary effort. But even here it must be remembered that only a very small amount of his material was ready, finished for publication when Novalis died.

EARLY YEARS AND UNIVERSITY LIFE

The very short period of Novalis' active intellectual life can be divided conveniently into four parts: the first, early years and the years of university life until Novalis went to Tennstedt at the beginning of November in 1794; the second, the following three years until November, 1797, when he took up his life at Freiberg; the third, his Freiberg stay; and the fourth, beginning with Novalis' return to Weissenfels in May of the year 1799 and closing with his death in March, 1801.

When Novalis went to the University of Jena in October, 1790, he took with him his own library collected during his youth. The list of books¹ in this collection indicates quite well wherein lay his training and interest until this time. The fine library to which he had access while living for a year with his uncle Friedrich Wilhelm von Hardenberg in Lucklum near Braunschweig introduced him to the literature of the time and to many fields of thought. The influence of the spirit of enlightenment first exerted itself on the youthful Friedrich, but very soon the lighter rococo style superseded the other, and Gottfried August Bürger² with whom he had become acquainted early in 1789, became his teacher. Some two hundred poems were written during the years 1789-1790. Others go back even to 1785. The list of books in his own library indicates his interest in the anacreontic poets, which accounts for much of the subject-matter and style of these early poetic

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1. Novalis' Schriften (Kluckhohn), Bd.4, S.471 ff., Liste I (1790) "Bücher, welche ich unmittelbar nach Jena mitnehme und welche ich vorerst nach Schlöben schicke."
 2. (1747-1794); Professor of Aesthetics and Philosophy at Göttingen, Author of "Leonore."

attempts. Nature at this time was merely an accessory background for frivolous, trifling love-play and sentimental dreaming. The beauty of nature was sung about, even though it had not been really felt. Sentimental reverie and imagination made him speak of the eager hand of man tearing at the bowels of the Harz mountains in unquenchable desire for the minerals gold and silver.³

The few months the eager lad spent in Eisleben under the tutelage of Rektor Jani gave him an introduction to the Greek and Latin classics, and they found their place in his library with its one hundred and forty-four titles covering a wide variety of subject-matter.⁴ Then he stepped into university life at Jena--a full life with study and pleasure--and remained creatively unproductive. In acknowledging his debt and gratitude to two great teachers, Schiller and Professor Reinhold, and to his friend, Professor Karl Chr. E. Schmid,⁵ Novalis speaks of

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3. Novalis' Schriften (Kluckhohn), Bd.1, S.311, "Der Harz;" cf. S.307 for expression that only destruction reigns in this world; and S.316 for the thought that out of wild chaos an elysium miraculously springs.
 4. Novalis' Schriften (Kluckhohn), Bd.4, S.471 ff.
 5. Ibid., S.25--Novalis is writing to Professor Reinhold: "Wenn noch einst meine Bewegung zur Tätigkeit, meine Reizbarkeit zu echtem Gefühl, meine Natürlichkeit zur Natur, meine Funken zur Wärme, meine Genialität zu Genie, mein Entwurf zur Ausführung, meine Vorstellung der Empfindung zur Empfindung, meine Mässigkeit in Mässigung, mein Sinn zu Charakter, meine Anlage zur Ordnung, meine Vielseitigkeit zur Mannigfaltigkeit, und meine Vielheit zur Einheit, meine Ahnungen zu System verschmelzen, und meine Vernunft das entscheidende Übergewicht über Sinnlichkeit und Phantasie erhält, und Natur und Einfachheit meine Hausgottheiten wurden, meine Liebe und mein Enthusiasmus für so viele Dinge eine bestimmte, festere Richtung, eine ebenso leichte als glückliche Anwendung erhalten: dann verdank ich wenigstens Ihnen, Schillern und Schmidten die dazu so nötige Aufmerksamkeit und Beobachtung meiner selbst, ohne die alle Kämpfe fruchtlos, alle Mühen vergeblich sind."

this period as one of misdirected and wavering activity, until they, Schiller particularly, finally had set him on a definite course. He had begun a course in jurisprudence, and he meant to carry it through, even though he made the following confession to Schiller on the twenty-second of September, 1791:

Sie machten mich auf den mehr als alltäglichen Zweck aufmerksam, den ein gesunder Kopf sich hier wählen könne und müsse, und gaben mir damit den letzten entscheidenden Stoss, der wenigstens meinen Willen sogleich fest bestimmte und meiner herumirrenden Tätigkeit eine zu allen meinen Verhältnissen leichtbezogene und passende Richtung gab. Ich kann Ihnen zwar nicht verhehlen, dass ich fest glaube, dass meine Neigung zu den süßen Künsten der Musen nie erlöschen und meine liebe, freundliche Begleiterin durchs Leben sein wird, dass immer die Werke der Lieblinge Apolls einen unnennbaren Zauber für meine Seele behalten werden..... Aber demohngeachtet hoffe ich auch, zu Gunsten meines besseren, aber vielleicht kleinsten Selbsts, der Vernunft, meinem gefassten Vorsatz und dem mir am fernen Ziel winkenden Genius der höhern Pflicht treu zu bleiben und dem Rufe des Schicksals gehorsam zu sein, das aus meinen Verhältnissen unverkennbar deutlich zu mir spricht.⁶

This decision was adhered to throughout his life. His poetic work remained and was always considered to be an avocation, "nur Nebenarbeit." Novalis' first interest in medieval history, an interest which culminated in his poetic masterpiece,⁷ is supposed to have been roused by the historical lectures of Schiller.

Even while at Jena Novalis resolved to become steadier in purpose and to gain more exactness, and

6. Novalis' Schriften (Kluckhohn), Bd.4, S.19 f.

7. Ibid., Bd.1, S.13*.

this he determined to do by careful application to three sciences: jurisprudence, mathematics, philosophy. However, early in 1793, he was still lamenting in a letter to his father: "Ich muss noch erzogen werden, vielleicht muss ich mich bis an mein Ende erziehn."⁸ Then came the change to Wittenberg, where he passed his law examination June, 1794, after a comparatively short time of steady application. In November of that year he began his clerical work in Tennstedt.

During these years of university life, few scientific references occur, either in the early "Prosabuchstücke" or in the early poems. Science as science with its real value was not yet a real part of his life. He was still speaking in flowery words of the heavens and the sea and the stars as inseparably held together by a chain.⁹ He was still yearning to be a Cook,¹⁰ sailing the seas either to the east or to the west--for the triumph and honor it might bring him.¹¹ But with the duties at Tennstedt and the association with his superior August Cölestin Just and Sophie v. Kühn we see a very different side of Novalis coming to the fore.

8. Ibid., Bd.4, S.38.

9. Ibid., S.71.

10. James Cook (1728-1779); Circumnavigator of the world.

11. Novalis' Schriften (Kluckhohn), Bd.4, S.15.

TENNSTEDT - WEISSENFELS PERIOD

The versatile personality of Friedrich von Hardenberg began to develop in Tennstedt and under the influence of the Grüningen circle. His whole rich spiritual life was beginning to unfold. The sturdy, enduring qualities of his character were being put to the test. He was equal to all sorts of contacts. The honourable citizens of Tennstedt and Weissenfels, the happy family groups at Grüningen and Tennstedt, the staid, prudent civil officers, all have only praise for the promising young man. The excerpts collected by Professor Kluckhohn give a delineation of Friedrich von Hardenberg as a well-rounded, fine, reliable character. Testimonies from the most diversified people make up the picture. Romantic writers,¹ scientists,² Kreisamtmann Just and an official of the financial world,³ a modest poetess⁴ and a governess,⁵ professional superiors and co-workers,⁶ friends and acquaintances, contribute to the picture.

In Tennstedt Friedrich von Hardenberg was assigned to Kreisamtmann Just for his training. This man Just has been described as a man much greater than his position, with extraordinary keenness of mind, and as a man highly respected in the official

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1. Friedrich and August Wilhelm Schlegel, Ludwig Tieck, Friedrich Schleiermacher.
 2. Henrik Steffens, Johann Wilhelm Ritter.
 3. Julius Wilhelm von Oppel.
 4. Luise Brachmann.
 5. Jeannette Danscour.
 6. Bergrat Senf, Direktor Heun, Geheimrat Andreas v. Wagner, Finanzrat v. Manteuffel.

world.⁷ Such a man could stimulate and recognize in his young helper the versatile talent he possessed. He was found to be quick in apprehending and understanding. He was of an inquiring mind. The superior official, however, also praised the serious effort and the zeal and thoroughness his assistant brought to every task. In 1805 he wrote his biography of the young poet whom death claimed just as he was at the real beginning of his professional and poetical work. The following excerpt explaining the meaning of genius expresses the supreme tribute he wished to pay Friedrich von Hardenberg or Novalis⁸ as he was generally known after the beginning of 1798:

.....Sagt man endlich im allgemeinsten: 'Dieser Mensch ist ein Genie': so glaube ich, dass man diesem Ausdruck füglich keinen andern Sinn unterlegen kann und soll als den: 'Dieser Mensch besitzt vorzügliche Fähigkeiten des Geistes, um in jeder Kunst und Wissenschaft, die er treiben wird, als selbständiger Erfinder und Virtuose zu erscheinen; er besitzt die Kraft, jedes Wissenswerte mit Leichtigkeit zu lernen, mit Tiefe zu ergründen, mit Festigkeit zu behalten, mit Weisheit zu ordnen, mit Scharfsinn zu beurteilen; gleiche Stärke aller Geisteskräfte, gleiche Kraft, sie anzuwenden; gleiche Gewandtheit, sie auf den oder jenen Gegenstand zu richten, gleiche Lust und Liebe, sie zu gebrauchen.' Ich habe mir diesen Begriff jenes Ausdrucks von dem jungen Mann abgezogen, den ich mehrere Jahre seines kurzen Lebens, aber gerade diejenigen, wo sein Geist reifte, genauer zu beobachten Gelegenheit hatte, von Friedrich von Hardenberg. Und wenn man gemeiniglich den Genies den Fehler zuschreibt, dass sie nur oberflächlich sind, dass sie nicht stets bei einem Gegenstande halten, dass sie die ernstesten Gegenstände des menschlichen Wissens den gefälligeren nachsetzen, dass sie in ihren Ideen leben und sich zur praktischen Anwendung nicht bequemen wollen: so war dieses mit Hardenberg nicht der Fall. Alles wollte er

7. Novalis' Schriften (Kluckhohn), Bd.4, S.17*.

8. Ibid., S.229.

gründlich und wissenschaftlich erlernen, und keinen Gegenstand des menschlichen Wissens schloss er davon aus. Dabei gewöhnte er sich auch zum praktischen Leben und scheute die mühsame Erlernung des Details und Kleinigkeiten nicht, die ein guter Praktiker notwendig kennen und anwenden muss. Und mit dem allen verband er ein für alles Gute und Schöne, besonders für Natur, Freundschaft und Liebe empfängliches Herz, welches mit seinem Geiste in dem besten Einklang stand, so dass er weder über der Ausbildung des Geistes die des Herzens vergass, noch sein Kopf mit dem Herzen davonging; und dass er auch an andern Kopf und Herz richtig zu würdigen und zu unterscheiden wusste.⁹

After a little more than one year in Tennstedt, the official request made by Novalis' father, that he be made an unsalaried clerical assistant to the directors of the salt-works at Weissenfels, was granted at the end of December, 1795. Then came the two weeks in Langensalza with the chemist Wiegleb, and in February Novalis began his work in Weissenfels. With special study in one field of chemistry, halurgy, Novalis felt competent to begin his work as a novice in Saxony's salt-industry. This appointment was commented on in a letter to his friend Friedrich Brachmann in the following way:

.....Ganz bin ich nicht in meine Sphäre gekommen-- die Zeit, denke ich, wird mich schon näher rücken; man muss vielleicht in allen Sätteln gewesen sein, um auf einem recht zu sitzen. Auch ein heterogenes Geschäft schadet nicht--wenn es nicht unsre Kräfte übersteigt und unser Fleiss nicht zurückbebt. Ich hoffe meines Geschäftes Herr zu werden.¹⁰

It proved to be the beginning of an activity covering a large part of Saxony's intensive mining and industrial life. Saxony's rich underground store of wealth

9. Ibid., Bd.4, S.423 f.

10. Ibid., S.125 f.

had for some time been opened. There were the copper, silver, ore mines. Lignite was already being utilized. There was the sudden renewed growth of the salt-industry. As far as organization and technical advancement were concerned, the mineral and coal mining industry in the Freiberg district was acclaimed throughout Europe as superior. World importance was established by its efficient board of mines, by its academy,¹¹ and by its amalgamating-works equipped with the newest improvements.

Friedrich von Hardenberg's father was stationed at Weissenfels. As a director of mines he supervised the salt-mines of Artern, Kösen, and Dürrenberg. The governing board of this whole industry was composed of the various directors, of which Hardenberg's father was the first, serving from 1784-1814. One colleague, Director Senf, older than Hardenberg's father, with decidedly opposing ideas, caused much difficulty later when Friedrich himself was active. At the time, February, 1796, as "Akzessisten bei den schriftlichen Arbeiten der Salinendirektion," Novalis was making business trips to the various mines, going to Eisleben also, and with his father to Oberwiederstedt, then making a tour of inspection of mines at Artern, Kösen, and Eisleben. Sophie was ill, and by devoting himself to his work and to earnest study, he hoped to endure the months of anxiety. He was writing in his "Tagebuch": "Jetzt kann ich nichts Besseres tun, als die Studien vollenden....."¹² The Fichtean philosophy was holding a primary place in his studies.¹³ The "philosophische Studien und Bemerkungen" record his interests during the latter part of 1795 and during the next

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11. Founded in 1766 by an uncle of Friedrich von Hardenberg, a director of mines, Friedrich Anton v. Heynitz.
 12. Novalis' Schriften (Kluckhohn), Bd.4, S.374; Bd.2, S.217 f.
 13. Kluckhohn places the beginning of an intensive study of Fichte's system soon after the appearance of the work Grundlage der gesamten Wissenschaftslehre in 1794. (Novalis' Schriften, Bd.1, S.19*.)

two years. Letters add interesting reflections, which help to interpret his developing, conscious attitude toward philosophy and the natural sciences. The sciences and love, he writes, were filling his soul.¹⁴ The "Studien" and "Bemerkungen" appear for the first time in anything like complete form in the Kluckhohn edition.¹⁵ It is a "developing" attitude that is reflected in them and Novalis called all these observations and reflections "Einleitungsstudien" and "notwendige Übungen meiner Denkkräfte."¹⁶

First of all since the term "Wissenschaften" is constantly being used, an attempt should be made to explain Novalis' conception of it. In February, 1793, Novalis was assuring his father that he could always have recourse to the sciences, even if as a soldier he should come to harm physically. He spoke of the sciences as that which up to that time had meant most to him in life, "die Wissenschaften, die das Glück meines Lebens ausmachten bisher und gewiss jetzt nicht aufhören werden."¹⁷ Just exactly four years later he was encouraging his brother Erasmus to go on with the study of algebra as he had decided. For, he argues, the sciences have wonderful healing powers. At any rate, they quiet pain as opiates do, and they lift us into spheres where there is eternal sunshine. They were to him a solace without which he could not live, but with which he hoped to overcome any affliction.¹⁸ Early the following year, however, in March, 1797, the last days with Sophie in Grünningen crushed every hope for happier days with her, and it was his good friend Friedrich Schlegel to whom he poured out his discouragement and loneliness:

14. Novalis' Schriften (Kluckhohn), Bd.4, S.146.

15. Cf. Novalis' Schriften (Kluckhohn), Bd.3, S.400 ff.,
"Handschriftenverzeichnis."

16. Novalis' Schriften (Kluckhohn), Bd.4, S.116.

17. Ibid., S.41.

18. Ibid., S.177.

Der Lebensüberdruß ist entsetzlich--und ich sehe kein Ende. Ich hoffte, die Wissenschaften sollten mir einen Ersatz bieten--aber alles ist auch hier tot, wüste, taub, unbeweglich.¹⁹

The "philosophische Studien und Bemerkungen" do not make up a systematic, continuous, progressive inquiry. There is constantly recurring discussion and renewed consideration of the same problems. The influence of Kant became less strong as Fichte gained so strong a hold, only to be replaced by Hemsterhuis, when Novalis renewed the interest in the philosopher-archaeologist in the summer of 1797. Novalis was attempting to work out for himself the answer to his own recurring question: "Was ist Wissenschaft?" He was using such books as Joh. Sam. Traugott Gehler's Physikalisches Wörterbuch oder Versuch einer Erklärung der vornehmsten Begriffe und Kunstwörter der Naturlehre, and Charles Guillaume Frédéric Dumas' Bibliothèque de Science et des Arts, as well as Fichte's Wissenschaftslehre and Hemsterhuis' writings.²⁰ Practically all the comments pertinent to this question appear for the first time in the Kluckhohn edition. Of the twenty-two references to "Wissenschaft" and its connotation only seven had appeared in the earlier editions.

In an attempt to determine just where, or at least approximately where Novalis drew the line between "Wissenschaft und Philosophie," science and philosophy, and later, between "Naturwissenschaft und Naturphilosophie," it must be recalled that the term "natural philosophy," even for a long time after scientific research had been progressing, retained its old meaning. It was a general term applied to any inquiry of a chemical and physical nature, just as "natural history" for long included any science dealing with life or with the structure of the earth.

19. Ibid., S.179.

20. Ibid., Bd.2, S.284 ff.

The latter part of the eighteenth century marks the beginning of the differentiation between sciences. This was due to the intense scientific activity of that period.

Novalis attempts to draw a distinction between science and philosophy; and then there are also the philosophical sciences. Science he defines as "die nach einer Idee geordnete Totalität von Begriffen eines Gegenstandes."²¹ Philosophy is something more than that. It must, however, not be disconnected from objects and the conception of them which must be acquired by observation. Philosophy is fundamentally and originally feeling, and the conception of this feeling can be apprehended by the sciences called "philosophische Wissenschaften."²² And these philosophical sciences are the product of philosophy. And only from this product can we draw any inference as to what this original feeling is. Novalis calls the whole of philosophy the science of reason, without the least reality in the true sense, for reason is merely "eine ordnende Idee."²³ Then he approaches all this from a different angle.²⁴ In philosophy, he says, form comes first. It is subjective. In applied science matter comes first, and is both objective and subjective. In pure science it is matter likewise which comes first, but pure science is purely objective. But science, whether pure or applied, is always science, starting with that which is directly limited, and passes to the indirectly limited. Philosophy proceeds from the indirectly limited to the directly limited. "Populär ausgedrückt," he says, "jedes geht so weit es kann-beides ist eins, in umgekehrter Richtung."²⁵ Such a statement was being made by Novalis when many a scientist was beginning to believe in the all-comprehending ability of experimental science to explain the world by physical

21. Ibid., Bd.2, S.139.

22. Ibid., S.224.

23. Ibid., S.216.

24. Ibid., S.270.

25. Ibid.

principles, disregarding both the biological and psychological standpoints. At present great scientists are accepting the idea that physical inquiry is merely a partial view of the world, and gives merely one aspect of phenomena. The whole theory of relativity has climaxed the view that mind and matter are one. The dualism between the psychical and the physical is merely a provisional one, and does not necessarily separate the two domains. But scientific thought leading to what is generally called positive knowledge, does not concern itself with any sort of ontological assumption, even though scientific thinkers accept the close interconnection of the two domains. The object of the natural sciences is to bring together harmoniously the phenomena which act on our senses. Philosophy or metaphysics may use the results of scientific investigation. The metaphysical problem, however, concerns itself with the "why" of phenomena, looking for that which is behind physical phenomena, not attempting to question "how" physical phenomena are related. The success of the scientific investigator who is interested in the "how," depends upon the ability to disregard the purely individual as important, showing that it is merely part of the general. Novalis said: ".....die Wissenschaft kann sich nur auf das Allgemeine und Gemeinschaftliche einlassen."²⁶ Of philosophy on the other hand: "Philosophie soll das Allgemeine alles Besondern enthalten."²⁷ It remains to be seen whether Novalis always kept the two clearly apart. Then also one must consider whether the two can be kept clearly apart. During the development of natural science as such, it has been closely bound up with various philosophical systems, and ontological assumptions have sometimes done much to promote progress. The nineteenth century brought natural science to a position very independent of philosophical theories. Novalis came just at the time when natural science

26. Ibid., S.123.

27. Ibid., S.126.

was beginning to want this independent position, and yet we see in his fragmentary statements a suggestion of the attitude taken today by many intuitive scientists, who recognize the limits of empirical science. "Wie ist reine Wissenschaft im Menschen möglich--oder wie ist der Mensch das, was er ist?"²⁸ Novalis asks. Pure science should deal with the typical, the abstract only, and yet, the individual always comes in--and we shall see this in Novalis very strongly. Natural science is a science of physical percepts; it has to work with that which the senses perceive. But sometimes there is something else which enters in, something which directs the scientist to perceive a certain relationship in a complex. This something is absolutely necessary for a scientist who would make a striking scientific discovery. It is intuition, the same fleeting intuitive, imaginative apprehension which the artist and the mystic experience. And that is what we shall find right along in Novalis' "Studien und Bemerkungen" and "Fragmente," that he was proceeding from a personal feeling within, which colored so much of his writing, and yet, in his professional work he could write very objectively, as we shall see.

Novalis' direct references to any of the natural sciences during this period are practically negligible. He was still most interested in reflecting on such questions as the following: "Welche Gegenstände sind eigentlich wissenschaftlich? Oder was ist an einer Wissenschaft eigentlich Wissen=schaft?"²⁹ He attempted to define for himself "Substanz," "Stoff," and "Materie." "Substanz" is the sum-total of the distinguishable reality of an object;³⁰ "Stoff" is that which can be perceived without fundamental connection of any kind--"Stoff ist

28. Ibid., S.256.

29. Ibid., S.223.

30. Ibid., S.139

These;³¹ and "Materie" is "der Stoff der Vorstellung des anschaulichen Stoffs überhaupt."³² Matter then is the "material" which makes up that which represents what has been perceived intuitively. It is "matter"--that which is necessarily inferred from the existence of a percept--that interests the natural scientist, not that which exists behind phenomena. All the way through the history of developing science, however, the existence of various substances and ethers has been assumed, which might be simply concepts, not realities independent of the psychical world at all. Even Newton, one of the greatest scientists the world has ever produced, derives the "material" phenomena of the physical world from an "immaterial" source. Only a mystical synthesis can identify force and matter and the spirit of animation as he did. Novalis reflected upon this, whether heat and other forces of nature are primal and have been continuously active and increasing, now merely checked, as is gravity and air in a compressed state.³³ His own words follow:

Sind Wärme und andre Kräfte der Materie
ursprünglich und fortwährend wirksam und
wachsend, und jetzt nur wie die Schwerkraft
gehemmt? So die Luft—Sie ist im Zustande der
Kompression.³⁴

Newton's theories were, of course, modified by the tremendous progress in chemistry and electricity which the eighteenth century saw. Various scientists replaced Newton's ether by other "gases." A consuming search for gases and their miraculous qualities reached its height about 1800 with Sir Humphrey Davy in the lead. Novalis had not progressed that far as yet. Novalis accepted a chemical element, a material

31. Ibid., S.145.

32. Ibid., S.256.

33. Ibid., S.284.

34. Ibid., S.284.

which cannot be divided further, as the original material.³⁵ He, however, speaks of chemical division as "unendlich wie die mathematische,"³⁶ and surely analytical chemistry will then have to come back to an absolute synthesis to reach completion. These few direct references to particular sciences fall in the last year of this second period, which brings us to November, 1797, when Novalis left Weissenfels again.

35. Ibid., S.142.

36. Ibid., S.304.

LIFE AT FREIBERG

The first of December, 1797, found Novalis in Freiberg, where he stayed until May, 1799. Into this period fall the "Freiberger Studienhefte und =blätter" and "das allgemeine Brouillon." Blütenstaub and Glauben und Liebe oder Der König und die Königin were published in 1798. Then there were also the "Vorarbeiten zu neuen Fragmentensammlungen" in the same year. The first of Novalis' really poetic works grew out of his intensive study of the natural sciences and the philosophy of nature at Freiberg. However, this work, Die Lehrlinge zu Sais, still retained a bit of general theoretic disquisition in spite of its poetic character. This period is the real "Frag=mentenzeit" in Novalis' short life.

Sophie died in March, 1797. Novalis lamented the death of his loved one for nine months, but a new strength seemed to come over the twenty-four-year-old Friedrich. From now on an active occupation was to direct his life, his subjective life was to be restricted to "Nebenstunden." He went to Freiberg with the intention of applying himself to the study of the natural sciences, especially geology, in order to prepare himself thoroughly for his practical occupation. The overwhelming amount of work the young student did in Freiberg can only be measured and appreciated when we consider the mass of fragmentary material which resulted from his searching study in various fields. It is of little concern here that very little of purely creative work in the field of the natural sciences resulted. It is especially his understanding of these sciences and their important place at the turn of the century that we are concerned with. More than ever he was now to show himself a man standing in the midst

of life, experienced, practical, and wide-awake, perfectly at home in the active world, but also a kindred spirit in the mystic world, capable of a transcendental life.

The close connection Novalis felt himself to have with physical nature¹ made him investigate eagerly and study rather thoroughly the new discoveries and theories coming to the fore during this particular period. He did not use the knowledge he gleaned from such study in order to go on independently in any field of science, but he used it to tie up certain ideas and personal experiences. Equipped with the knowledge of exterior nature, he turned a searching eye inward, into his own soul. What he was ultimately striving for was "ein mitlebendes und einführendes Erfassen der Natur." Goethe was doing the same thing. He was poet above all, though his work as an investigator of nature was certainly not insignificant. For the first time we find in the lyric, nature's own mood as the primary experience releasing human moods. There can be no Rousseauist sentimental carrying-over of personal moods into nature, when a scrutinizing observation accompanies intuitive feeling, but this intuitive feeling of oneness with nature also colors the purpose of observation. Classification and analysis cannot be the ultimate goal. A new attitude toward nature is developing. Nature is an organic complex entity, developing according to some intrinsic law. Man is only a part of this whole. To understand man one must understand all of "nature." And through nature may come understanding of man.

1. It was just this which made Novalis turn to Jakob Böhme, away from Fichte, and which he felt was lacking in Friedrich Schlegel. In Fichte the outer world was merely a product of the ego, which opposed the Romantic striving for complete harmony, and was also out of keeping with the new attitude toward nature characteristic of the time. In this respect Novalis was going hand in hand with a significant trend of the times.

The last part of the eighteenth century was a period of very important scientific discoveries, but it was also a period of unrestrained, bold hypotheses. Robert Boyle² is very often called the father of modern chemistry. Very little progress had been made in chemistry before his time. Boyle's work on gases and his invention and use of the hydrometer, which made it possible to determine specific gravity of liquids and solids, made progress in organic chemistry possible during the eighteenth century. Sir Isaac Newton's³ contributions to mathematics and astronomy --along with those of other illustrious men such as Copernicus, Tycho Brahe, Kepler, and Galileo--made rapid advance possible in these two sciences. Newton proved that there is a consistent mathematical principle governing astronomy, that all movement of the solar system can be explained and understood from the one assumption that every particle of matter behaves as though attracted by all other particles with a force proportional to the square of the distance between them. Such proof brought the conviction that facts of nature could be definitely represented by accurate mathematical analysis. Newton's work in optics too was quite significant. Friedrich Wilhelm Herschel⁴ in the next century was the astronomer who, with the aid of a telescope, ventured further and sought to make investigations as to what the heavenly bodies themselves were. In the field of "natural philosophy" rapid progress was evident in the eighteenth century in spite of the persistent erroneous theory of combustion, that inflammable bodies contained an invisible substance "phlogiston," which showed itself as a flame when expelled. Priestley⁵ upheld this theory; his contemporary, Lavoisier⁶, demonstrated the true nature of combustion; and Henry

2. (1627-1691).

3. (1643-1727).

4. (1738-1822).

5. (1733-1804).

6. (1743-1794).

Cavendish⁷ discovered hydrogen and worked out the composition of water.⁸

Interest in magnetism and electricity was growing. Galvani⁹ was carrying on his investigations as to the susceptibility of nervous tissue to stimulation and irritation. His experiments with frogs as early as 1789, gave proof of "animal electricity." Galvani discovered that if nerves and muscles were connected by a metallic arc formed of certain metals, the limb of the frog might become violently convulsed. An electrical current was being produced, that is all. Galvani, however, believed that a different kind of electricity--electricity of animal origin--was being produced. He called it galvanism. Another electrical phenomenon was thought to have been discovered by Volta¹⁰ in the voltaic pile. Volta showed that the galvanic effect could be made much greater by constructing a pile in which a number of pairs of zinc and copper discs were used. Volta for a time also believed that the convulsive actions manifested in Galvani's experiments with frogs proved an especial electric force inherent in an animal organism. Though Galvani continued to maintain that the observed phenomenon had its cause in the animal organism, Volta in 1800 showed the organism to be a mere electroscope indicating passing electricity. Animal electricity and electricity of the voltaic pile were shown to be different forms of the same thing. These experiments of Galvani and Volta were really the first important experiments in this field of scientific activity. Revolutionizing discoveries resulted from these experiments. William Gilbert,¹¹ physician to Queen Elizabeth, had been an early investigator in

7. (1731-1810).

8. Novalis still called water "dieses erstgeborne Kind luftiger Verschmelzungen." Cf. Die Lehrlinge zu Sais--Novalis' Schriften (Kluckhohn), Bd.1, S.36.

9. (1737-1798); Professor of Anatomy at Bologna.

10. (1745-1827).

11. (c. 1540-1603).

the field of electricity and magnetism. It was, however, not until very much later, that electricity took a real place in rational medicine. It was not until 1733 that Dufay¹² even explained the apparently contradictory phenomena of attraction and repulsion of electrical forces, and then there was still the misunderstanding in connection with the electric relations of living matter.

Further successful experiments by Galvani without metal aids again succeeded somewhat in establishing a division line between the organic world and the inorganic world. In an earlier book, Versuche über die gereizte Muskel = und Nervenfasern nebst Vermutungen über den chemischen Prozess des Lebens in der Tier = und Pflanzenwelt (1797), Alexander von Humboldt had ranged himself on the side of Galvani. He agreed with Galvani that the metals and chemicals assumed a merely secondary role in the stimulation of the irritability inherent in the animal organs. In his judgment of the nature of the stimulant, however, and of the nature of the imponderable materials, he was very hesitant and sceptical. Humboldt was the first to use the term "vital chemistry," to indicate the chemical interconnection within the organic world as distinguished from the chemistry of inanimate materials. The term came gradually to mean merely the operation of chemical processes in an animal or plant.

During the latter part of the eighteenth century, there still existed a condition, which we must accept as quite natural, when we consider the state of feverish restlessness existing at the time. The scientific enthusiasts went beyond the results of research. Magic and mysticism rose up with renewed force, and as a result a great many vague and fanciful theories were seen coming to the fore in the shape of speculations connected with electricity and galvanism

12. (1698-1739).

and magnetism. Haller¹³ had opened the way for the vitalistic-organic conception, which was to supplant the mechanistic conception of nature. Mesmerism grew out of vitalism. False conclusions were drawn from perfectly correct observations, and the doctrine of animal mesmerism developed. Mesmerism was to serve as a means in the study of animal magnetism, in the search for the subconscious seat of psychic disturbances. False hypotheses and arbitrary analogies could very easily result from the new discoveries connected with magnetism, electricity, galvanism. The same observed phenomena, however, were also forming the basis for the new dynamic-organic interpretation of nature and its processes.

The young German physicist, Johann Wilhelm Ritter,¹⁴ took a tremendous interest in all these new so-called galvanistic phenomena. Humboldt could say of the young physicist that thorough chemical knowledge was being combined by him with genuine observative genius. After carrying on his own experiments, Ritter agreed with Galvani that animal-matter alone, under proper conditions, could serve as an effective chain. But he saw more than the manifested animal irritability. Ritter extended his investigations until he could say that an incessant galvanism must accompany all life and its processes. His book, Beweis dass ein beständiger Galvanismus den Lebensprozess in dem Tierreich begleitet (1798), is indicative of this. He sees manifested in the new phenomena a universal, unrecognized natural law, which is to remove all differences among various parts of the individual animal, plant, metal, and stone, among the various animals, plants, etc., and finally

13. Albrecht von Haller (1708-1777); Famous Swiss poet-anatomist and physiologist. He first demonstrated the importance of the properties of irritability and sensibility in the nervous system. He also emphasized the function of the brain in synthesizing the elements which represent physical sensations.

14. (1776-1810).

the differences among all these classes. Overwhelmed by this idea of possible unity, of an organic whole--that which he calls "das grosse All-Tier, die Natur"--there rose in Ritter's mind a firm conviction that there could be but one true theory encompassing all nature-phenomena.¹⁵ His new book, Beiträge zur näheren Kenntnis des Galvanismus (1800), gives evidence of his extended field. Galvanism may also be possible in inorganic nature. Further discoveries that galvanistic and chemical processes were going hand in hand, placed the theory that both were variations of one single fundamental phenomenon on a firmer basis. His book, Das elektrische System der Körper, gained much recognition for him. Building on Ritter's attempt to fathom galvanistic phenomena in purely scientific fashion, Novalis proceeded to the hypothesis of a "galvanism of the spirit." This is just one example of the endless applications of "galvanism" and all the related phenomena, which resulted from experiments giving evidence of response to stimulation of one sort or another. All such related experimentation could easily lead to an attempt to explain the dependence of life in all its forms, with all its "responses," on something which works from within outwards.

Physiological and anatomical studies were constantly raising questions as to the nature of the agencies which would account for all physiological processes, and with these questions were coming others concerning the nature of the interaction between body and mind. William Harvey¹⁶ and Descartes¹⁷ had encouraged the belief that all physiological processes could be accounted for by mechanical agencies. Anatomical and biological studies, on the other hand, were tending to set organic nature off from inorganic. The concepts of sensibility and irritability were

15. Beweis, dass ein beständiger Galvanismus den Lebensprozess in dem Thierreich begleitet—S. IX & 171.

16. (1578-1657).

17. (1596-1650).

playing the important role in physiology after Haller's discoveries had put such emphasis on these properties. Sensibility was interpreted as the nerve-force acting on muscular tissue, irritability as the force inherent in the muscular tissue itself and bringing about the response. Irritability was really the motor-force of the muscles. A more fortunate choice of terms to designate these properties evolved. Muscle fibre was said to be contractible rather than irritable, and the term irritability was used to designate nerve-force.

The Scottish physician John Brown¹⁸ departed completely from the original limited, special significance of these concepts of Haller and worked out an extreme generalization of the whole idea. As a student at Edinburgh, John Brown had attracted the favorable notice of William Cullen, physician and medical teacher. From about 1778 on, however, Brown directed his public lectures against all preceding systems of medicine as uncertain and incomprehensible. He saw the essence of a living organism in its irritability, which he termed excitability. This one concept became for him the starting-point of all his medical notions. He claimed at last to have reduced

the medical art, hitherto conjectural, incoherent, and in the great body of its doctrines false,.....to a science of demonstration, which might be called the science of life.¹⁹

Life meant possessing excitability and experiencing stimulation. Stimulation maintained the vital process. The condition of life depended upon the ability to experience stimulation. Increased or decreased excitability resulting from too strong or too weak

18. (1735-1788).

19. Thomas Beddoes--The Elements of Medicine of John Brown.
Translated from the Latin, with Comments and Illustrations
by the Author, p. XII.

stimulations, brought about illness. Regulation of excitability, maintenance of the correct degree of excitability meant health and life. New physiological problems arose. In order to regulate excitability, the physician had to have an exact knowledge of the results each stimulant would produce. Scientific experimental work was furthered. Most stimulants were chemical, and thus investigations in chemistry received consideration.²⁰ Drugs, especially laudanum,²¹ are among the best means the Scottish physician recommended for regaining the proper degree of excitability. Proper choice and correct amounts of stimulants made it possible for the doctor at any time to bring to normalcy sthenia, the condition of too great excitability, or asthenia, the condition of debility. This might be done directly or indirectly. A case of sthenia could be treated indirectly. After great doses of the popular drug laudanum, the resulting exhaustion might bring about the desired asthenia.

As early as 1795 a German translation of John Brown's Elements of Medicine came out in Frankfurt am Main.²² In 1803 Dr. Thomas Beddoes in England was

20. In Germany Alexander von Humboldt produced his book Versuche über die Stimmung der Erregbarkeit durch chemische Stoffe in 1798.
21. Paracelsus had first used this name for a preparation which contained opium as its chief ingredient.
22. Grundsätze der Arzeneylehre. Aus dem Lateinischen übersetzt von M. A. Weikard. According to Rudolf Haym, the Brunonian theory, however, was known in Germany already as early as 1790. In Die romantische Schule, S.641, he writes: "Im Jahre 1790 zuerst in Deutschland bekannt geworden, wurde dieselbe [Brown's Theorie] hier viel enthusiastischer aufgenommen als in ihrem Heimatlande....." Ricarda Huch in her book Ausbreitung und Verfall der Romantik, says that in the early eighties Brown's system had been brought to Germany by the German-Russian physician Weickard(t), from whom Röschlaub got it.—Cf. S.265.

again bringing out a new revised edition of the work, and speaks of Dr. Brown's system as having "wrought a memorable change in medical opinions and practice,"²³ in spite of its many disadvantages. In Germany this book, expounding a theory based on one single idea, the idea of excitability, was calling forth a flood of pamphlets and books. Garrison in his History of Medicine says that the Brunonian theory

actually held the attention of Europe for a quarter-century, and, as late as 1802, a students' brawl, between Brunonians and non-Brunonians at the University of Göttingen lasted two whole days and had finally to be put down by a troop of Hanoverian horse.....²⁴

Humboldt in Germany was among those pointing out Brown's errors, but the outstanding medical man Röschlaub was following him completely. The physicist, Johann Wilhelm Ritter, who won Cuvier's acclaim, had turned to Dr. Brown's book. Poets everywhere were aware of his influence.²⁵ Novalis called him the physician of "our time,"²⁶ the man who recognized the most essential, the most characteristic symptom in illness, even though he may have failed to discover the cause of illness. He says:

Brown ist der Arzt unserer Zeit. Die herrschende Konstitution ist die zärtliche, die asthenische. Das Heilsystem ist das natürliche Produkt der herrschenden Konstitution,—daher es sich mit dieser ändern muss.²⁷

23. Biographical preface to Elements of Medicine of John Brown, p. iv.

24. Fielding H. Garrison—An Introduction to the History of Medicine, p. 243.

25. In England the poets Coleridge and Southey with the Bristol friends, the Wedgwoods and Poole, with Sir Humphrey Davy and Dr. Thomas Beddoes; in Germany, Justinus Kerner, the physician and poet, and Friedrich Schlegel, as well as Novalis and Tieck. Any mode of medical treatment which seemed to indicate a reciprocal action between psychical and physical forces roused great speculation.

26. Novalis' Schriften (Kluckhohn), Bd.2, S.387, 363.

27. Ibid., Bd.2, S.387, 363.

Tieck spoke of the age being subjected to a Brunonian cure. Dr. Brown's stronghold in Germany was Göttingen.

One other field of scientific investigation was gaining wide developmant during the last decades of the eighteenth century. Even at the middle of this century the world of plant and animal life as a whole was still almost unexplored. "Natural history" had for so long included the biological subjects, linking botany and zoology with geological knowledge, and the differentiation between these sciences was not yet clear. In regard to the structure and formation of the earth, vague speculations prevailed until Dr. James Hutton's theory of the earth, published in 1795, started a great progress in geology. His simple doctrine of "uniformitarianism" started a great controversy. His followers insisted on geological research which confined itself to the study of the materials of the earth. The opposing group, the Wernerians, insisted on stressing the study of the origin of the earth. Not until Charles Lyell's Principles of Geology were published in 1830, which stressed the theory that the processes of nature which are still at work had caused the changes in the earth's surface and structure, could geology really become a science.

Freiberg was one of the centers of this active life involving discoveries and theories and ideas concerning the many "new" sciences which were gaining a strong hold upon the great minds of the period. Novalis went there with a strong interest in the science of mining and medical science. His liking for and interest in medical science had been greatly furthered and increased by Sophie's long illness, but the wishes of his father and his practical foresight decided him on the other profession. Geological and mineralogical studies were his primary interest, supplemented by mathematical, physical, and chemical studies. For all of these Novalis kept

"Studienhefte,"²⁸ but into his "fragments" as a whole any scientific material of interest found its way. Excerpts from scientific literature were made. There were added notations and critical comments which show a keen critical mind, and indicate his way of independently developing any idea which had roused his interest. He may have been strongly drawn to Werner, but he could nevertheless direct critical comments against his teachings.²⁹ We find in his "Tagebücher": "Die Revision des Wernerschen Systems und die Kritik meines Unternehmens muss nun die erste Arbeit sein."

Novalis ultimately reached his highest achievement in poetic work and yet until after the Freiberg period he really had accomplished nothing truly great. He was and always remained "Fremdling in der Poesie"³⁰ as Ludwig Tieck says of him. He had read comparatively few authors and poets, he had not concerned himself with criticism and the various schools of poetry. The fields of science and philosophy were the ones in which he was reading and

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28. In general the various "Studienhefte" were kept for particular sciences. In addition during the first part of 1798 the "Vorarbeiten zu neuen Fragmentensammlungen," and during the second half of that year and the first part of 1799 "Das allgemeine Brouillon" were getting everything which didn't belong directly into the "Studienhefte." Cf. Novalis' Schriften (Kluckhohn), Bd.3, S.9, In the group "Vorarbeiten zu neuen Fragmentensammlungen" come the two collections: "Logologische Fragmente" and "Poetizismen."
29. Cf. "Tagebücher," Novalis' Schriften (Kluckhohn), Bd.4, S.401.
30. Novalis' Schriften (Kluckhohn), Bd.4, S.457. He did take Goethe as his master to a certain degree. Ernst Kamnitzer who brought out an edition of Novalis' works Sämtliche Werke in 1924, voices the same opinion: ".....nein, Novalis war überhaupt nicht recht ein Dichter zu nennen (sofern man unter Dichter einfach versteht die Gabe und den Wunsch, Dichtungen zu schaffen, worin das Geformte, Vollendete implizite mitgegeben ist), freilich nicht in dem ärgerlichen Sinne Hebbels, als sei er darum weniger als ein Dichter...."—Bd.1, S.XIII.

studying. In these fields, moreover, his ability was recognized. Tieck said that his observations, his ideas, and his constructive talent in physics often reached far ahead of his time. His knowledge in mathematics and mechanics, and especially metallurgy was accepted by Tieck as worthy of notice.³¹ In mathematics this has been verified in the study by Käte Hamburger. In her article,³² Novalis is shown to have given proof of logical constructive combinations of ideas, which led him toward goals which were partially realized by investigators during the nineteenth century.³³ We need not take Henrik Steffens too seriously, when he mentioned Novalis in the following statement:

.....Er ist ein geistvoller Mensch; aber er hat mich von neuem davon überzeugt, dass selbst die geistvolleren Menschen unseres Zeitalters wenig Sinn haben für wissenschaftliche strenge Konsequenz.³⁴

For later, he spoke of him as equally at home in the fields of science and poetry. He recalled that men completely absorbed in practical living, as also empirical investigators, were tremendously impressed by the man.³⁵

Although Novalis' active interest in medicine, which had been so greatly intensified by Sophie's

31. Ibid., Bd.4, S.457. Metallurgy--the science and art of extracting metals from their ores, refining them, and preparing them for use. It includes various processes, as smelting, amalgamation, electrolytic refining, rolling, heat-treating, etc.

32. Novalis und die Mathematik--Eine Studie zur Erkenntnis=
theorie der Romantik.

33. Interesting in this connection is Novalis' statement in "Das allgemeine Brouillon"--"Es gibt als konkrete Wissenschaften nur Mathematik und Physik."--Novalis' Schriften (Kluckhohn), Bd.3, S.228, 849.

34. Novalis' Schriften (Kluckhohn), Bd.4, S.463.

35. Ibid., S.464 f.

long suffering, was not to be developed for professional use, it continued nevertheless. And the Brunonian system holds no mean place in his fragments throughout this whole Freiberg period, even though he mentioned Dr. Brown directly just once, in his letters of this period, and that is early in his stay at Freiberg. In a letter to Friedrich Schlegel in December, 1797, he expresses his pleasure in Schlegel's epigrammatical dithyrambs. In one of them particularly, he says, Friedrich Schlegel has come upon a fruitful object, which is for him what laudanum is for Dr. Brown--a kind of universal medicine.³⁶ This expression, "eine Art von Universalmedizin," points to that which in the Brunonian system appealed to Novalis. There was in Brown's theory something which roused response in Novalis' active mind. Ideas came which could develop, reach out, upon which much reflection and speculation could be spent. Since 1794 he had known Fichte and his philosophy. A bit later came the interest in Brown and his system. One fragment draws the two together. He writes: "Fichte ist wie Brown zu Werke gegangen--nur noch universeller und absoluter."³⁷ He saw in Brown's system that which after all is the very essence of every "system," that which gives a system its really valuable strength. That is the amazing confidence with which Brown presents his system as the universally valid one, no matter what experience and nature may say. Thereby the Brunonian system became the genuine, true system for the Brunonians. "Dagegen," says Novalis,

lässt sich mit Grunde nichts mehr einwenden.

Je grösser der Magus, desto willkürlicher sein
Verfahren, sein Spruch, sein Mittel. Jeder tut nach
seiner eignen Art Wunder.³⁸

36. Novalis' Schriften (Kluckhohn), Bd.4, S.219.

37. Ibid., Bd.2, S.336, 105.

38. Ibid., Bd.2, S.335, 102.

Both Fichte and Brown put forth systems of "the ideal"--Fichte deals with a philosophical ideal, Brown with a physiological ideal.³⁹

Novalis realized wherein lay the strength of Dr. Brown's system, but gradually a more critical attitude toward it grew. The whole theory, however, was so stimulating for Novalis, that it started in him what he called "interessante Gedankenfolge." He took up what appealed to his individual soul, and that by means of which his own soul could come to expression. During the early part of 1798 Novalis was still following pretty closely and unquestioningly the generally popular belief in the miraculous powers of magnetism, galvanism, electricity--all the forces not clearly understood. Stimulation of any kind was rousing popular interest. Experiments with anesthetic gases were also bringing to the fore wild speculations. Physiological experiments were directing "theories of life" to sensation and stimulation, to irritability and sensibility, and to excitability. Dr. Brown had finally accepted the term "excitability" to express the "disposition to action" of any animate being.⁴⁰ A variation of excitability in animals brought with it a variation of susceptibility to the action of exciting powers, which could be external or internal. And these powers, says Dr. Brown,

produce all the phaenomena of life, and the only operation, by which they do so, is a stimulant; it follows, that the whole phaenomena of life, every state and degree of health and disease, are also

39. Novalis calls Fichte's "Wissenschaftslehre" "die Beschreibung des Ideals der Wissenschaft," and Brown's theory "das Ideal der Heilmethode." Cf. Novalis' Schriften (Kluckhohn), Bd.3, S.228, 849, and S.139, 445.

40. Thomas Beddoes--The Elements of Medicine of John Brown, p.lxxiii.

owing to stimulus, and to no other cause.....Excitement, the effect of the exciting powers, the true cause of life, is, within certain boundaries, proportional to the degree of stimulus.....⁴¹

The question of "vitality" is given no consideration. "We are nothing in ourselves," continues Dr. Brown,

but while we have any excitability remaining in proper capacity to be acted upon, we entirely depend on the exciting powers acting on it.....it is certain, that life is not a natural, but a forced state; that the tendency of animals every moment is to dissolution; that they are kept from it, not by any powers in themselves, but by foreign powers, and even by these with difficulty, and only for a time; and then, from the necessity of their fate, they yield to death.⁴²

Novalis at first accepted this line of thought. The Brunonian theory of stimulation is not exactly a question of health or illness, it concerns itself after all with the function of life in general.⁴³ And the essence of illness, bound as it is here with the essence of life, is equally mysterious. Death is the interruption of the interchange between what he called internal and external excitation, between soul and world; the body, that which is excitable is so to speak the product of these two infinitely changing

41. *Ibid.*, p. 93 f.

42. *Ibid.*, p. 115 f.

43. Novalis' Schriften (Kluckhohn), Bd.3, S.148, 491: "Die Brownsche Erregungstheorie im reinen Zustande bezieht sich weder auf Gesundheit noch Krankheit direkte. Sie bezieht sich auf Lebensfunktion überhaupt--und deren Einteilung, etc."

unknown "quantities."⁴⁴ All along there is of course the tendency of Novalis to carry various phases of the theory further, to question, to speculate, and soon he sees the shortcomings. At first he could say of Dr. Brown: "Er ist vielleicht weit freier, unsystematischer, willkürlicher als wir glauben,"⁴⁵ and criticize the physician Röschlaub. But soon, in discussing mechanical and chemical modes of treating illness, he is writing as follows:

44. Ibid., S.122 f., 367: "Tod ist nichts als Unterbrechung des Wechsels zwischen innerm und äusserm Reiz—zwischen Seele und Welt. Das Mittelglied—das Produkt gleichsam dieser beiden unendlichen veränderlichen Grössen ist der Körper, das Erregbare—oder besser das Medium der Erregung. Der Körper ist das Produkt und zugleich das Modifikans der Erregung—eine Funktion von Seele und Welt—diese Funktion hat ein Maximum und Minimum, ist dies erreicht, so hört der Wechsel auf..... Die Lebensordnungslehre im strengern Sinn enthält eigentlich die Kunst der Konstitutionsbildung und Verbesserung. Die eigentliche Heilkunst bloss die Vorschriften zur Erhaltung und Restauration des speziellen Verhältnisses und Wechsels der Reize oder der Faktoren. Der Künstler der Unsterblichkeit betreibt die höhere Medizin—die Infinitesimalmedizin—Er betreibt die Medizin als höhere Kunst—als synthetische Kunst..... Der äussre Reiz ist schon in seiner Unermesslichkeit gleichsam da und grössestenteils in der Gewalt des Künstlers. Wie gering ist aber der innere Reiz gegen den äussern. Allmähliche Vermehrung des innern Reizes ist also die Hauptsorge des Künstlers der Unsterblichkeit. Mit welchem Recht kann man hier nicht sagen, auch darin haben die Dichter auf eine sonderbare Weise wahrgesagt—dass die Musen allein Unsterblichkeit geben. Jetzt erscheint auch der gelehrte Stand in einem neuen Lichte....."

45. Ibid., S.45, 139.

Das Individuelle, propter Genesin, und Falsche des Brownischen Systems ist seine Neigung zur Mechanik. Aus Opposition gegen das herrschende System (so mit Fichte), das chemische, fiel Brown bei richtigem Gefühl des Unvollkommenen des Alten und sichrer Ahndung der Ergänzung—in das entgegen=gesetzte Extrem—in das mechanische System.....⁴⁶

Novalis insists that the general fundamental principles are true to a certain extent, but the groundwork, he says, is faulty. He questions whether life could be merely "komplizierte Erregung,"⁴⁷ and as to illness, Brown has absolutely not explained that. He is convinced that the explanation of how illness comes about lay far beyond Brown's ability.⁴⁸ The possibility, however, of an absolute explanation roused the active mind of the young man. Sometime in the future there surely must be developed the science of therapeutics in which there will not even fail to be "die Inokulation des Todes."⁴⁹ The transitional stages--the borderline between death and life, between illness and health--borderline "domains" always interested Novalis most. Everywhere in his fragments the interest in what now are termed the "borderline sciences" is evident.⁵⁰ Here particularly borderline stages of health and life are in question. "Halbkrankheiten" he calls them. There is another borderline between soul and world. Novalis had said that death was the interruption of the interchange

46. Ibid., S.138, 437.

47. Ibid., S.213, 795.

48. Ibid., S.252, 978.

49. Ibid., S.271, 1135.

50. A few of the terms occurring in the fragments: "Philosophische Physik," "Pathologische Philosophie," "Mathematische Physiologie," "Anthropomorphe Physiologie," "Meteorologische Physik," "Philosophische Physiologie," "Chemische Physiologie," "Physikalische Philosophie." Present day: Astro-physics, Physiological Psychology, Electro-chemistry, Physico-chemistry, Bio-chemistry, Paleo-biology, etc.

between soul and world. Possibly sensibility is part of the soul, and this inner sensitiveness is not as strong as the external one. Gradually to increase this inner sensitiveness would be the work of "an artist of immortality." "Der Künstler der Unsterblichkeit," he wrote, "betreibt die höhere Medizin--die Infinitesimalmedizin."⁵¹ This gives him beautiful opportunity to reach an idea which he expressed so many times a little later. "Der Dichter" is the real seer--"auch darin haben die Dichter auf eine sonderbare Weise wahrgesagt--dass die Musen allein Unsterblichkeit geben."⁵²

To have an infinite measure of health, to have a constitution capable of infinitely great and infinitely small irritability would mean infinite life, "unendlicher Rhythmus" as Novalis expressed it. It is Novalis' tendency always to draw his speculations in one field over into another. The following comparison to describe a completely healthy individual is typical of Novalis' mode of thought.

Das wäre das vollkommen gesunde Individuum, dessen Gesundheitssphäre auch die Sphären der Krankheit mit inbegriffe, so wie dasjenige Volk am gebildetsten sein würde, dessen Prosa--Rede--Gespräch die ganze Sphäre der Poesie und des Gesanges mit einschlösse--wo kein Unterschied zwischen Poesie und Prosa wäre.⁵³

Other fragments are a bit more purely scientific in thought. Novalis is perfectly aware of the comparatively backward attitude of many medical men. William Harvey's⁵⁴ introduction of precise methods of

51. Novalis' Schriften (Kluckhohn), Bd.3, S.122 f., 367.

52. Ibid.--Cf. S.49, 174: ".....Der echte Beobachter ist Künstler--er ahndet das Bedeutende und weiss aus dem seltsamen, vorüberstreichenden Gemisch von Erscheinungen die wichtigen herauszufühlen."

53. Novalis' Schriften (Kluckhohn), Bd.3, S.116, 340.

54. (1578-1657).

observation and experimentation into physiological science had started a great line of progress. During the second half of the seventeenth century there were two additional important scientific movements which furthered this progress toward gaining an understanding of the workings of the body. These were the movement for microscopical examination of the tissues and the movement from alchemy to chemistry. Albrecht von Haller collected and systematized a great many of the results of Harvey's work in his Elementa Physiologiae Corporis Humani. The doctrine and practice of medicine had, however, by no means reached a stage of scientific certainty or exactness. A great many confused, false popular conceptions of medical principles were still dominating even medical men during this period. Novalis speaks of all successful cures thus far as having been accidental, unconsciously attained, inconsistent, and instinctively wrought. He recognized two modes of medical treatment which might be considered as directly opposed to each other. The adherents of the one cure wanted to cure all by "Nahrung und Bewegung (Reizung)" as he says, the others by "Entnährung und Beruhigung."⁵⁵ The latter usually did too little, the former too much. Because of lack of knowledge, and ignorance of their drugs and cures, they often did just what they didn't want to do. It was chance whether they would help or harm, according as the nature of the illness conformed to their prognosis or remedy. Rather ironical is his statement that the best empirics, who have observed faithfully and have looked the system over as much as possible, are surest of success "after a filled cemetery."⁵⁶ Too often they forgot to apply systematic thought to collected experience; all they did was collect countless individual experiences. All this analysis brought Novalis back to the two opposing methods which must be combined. Observation must be combined with reflection, and inversely reflection

55. Novalis' Schriften (Kluckhohn), Bd.3, S.178 f., 646.

56. Ibid.

with observation. The gifted physician must be determined by himself as well as by the object he is treating, but without letting either restrict the other. There should be a reciprocal perfecting. Thus only can the human mind and its science and art be brought along the lofty way destined for it. In explaining an organism, "the soul" must be taken into consideration. Novalis realized that the physical must be understood to help understand the psychical, but without consideration of the presence of the psychical, understanding of the physical cannot progress far.⁵⁷ He admitted that the deeper he penetrated into the sciences, the better he could understand philosophy,⁵⁸ without which, to be sure, one could get along;⁵⁹ but he also wrote that the best part of science is its philosophic ingredient-- "Man dephilosophiere die Wissenschaften: was bleibt übrig? Erde, Luft und Wasser."⁶⁰

In one of Novalis' dialogues the question of hypotheses is discussed. The first speaker is sure

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57. Ibid., Bd.2, S.407, 450: "Wer bei der Erklärung des Organism keine Rücksicht auf die Seele nimmt und das geheimnisvolle Band zwischen ihr und dem Körper, der wird nicht weit kommen. Leben ist vielleicht nichts anders als das Resultat dieser Vereinigung--die Aktion dieser Berührung."
58. Ibid., Bd.4, S.220.
59. Ibid., Bd.2, S.218: "Man kann auch ohne Philosophie seine Bestimmung erfüllen, wenn man dem gemäss lebt, was die Weisesten und Besten taten und lehrten, und Erfahrung und gesunden Menschenverstand zu seinen Führern macht. Mit beiden und Fleiss wird man sich in alle Geschäfte des Lebens finden können und nicht ohne Ressourcen sein. Das reine Gefühl von der Natur der Sache--das nennt man gesunden Menschenverstand--und dies ist selbst den Gelehrten, den wissenschaftlichen Architekten, unentbehrlich. Übung kann seinen Gebrauch leichter machen--und echte Lebenskraft ungehemmt von Meinungen etc., erhält ihn rein. (Sein Entstehn ist langsam, sein Dasein plötzlich.)"
60. Ibid., S.25, 62.

that a single really observed fact is worth more than the most brilliant hypothesis. The response, however, assures one that hypotheses are very essential to the furthering of science. This is it:

Der echte Hypothetiker ist kein anderer als der Erfinder, dem vor seiner Erfindung oft schon dunkel das entdeckte Land vor Augen schwebt—der mit dem dunkeln Bilde über der Beobachtung, dem Versuch schwebt—und nur durch freie Vergleichung—durch mannigfache Berührung und Reibung seiner Ideen mit der Erfahrung, endlich die Idee trifft, die sich negativ zur positiven Erfahrung verhält, dass beide dann auf immer zusammenhängen—und ein neues himmlisches Licht die zur Welt gekommene Kraft umstrahle.⁶¹

We now come to those discoveries in science which roused the boldest hypotheses among learned men of the time, for science was not yet a universal interest. These discoveries were those of Galvani and Volta particularly, including the galvanic, magnetic, and electrical phenomena, all closely related to chemical reactions, and to experiments in physics. Robert Boyle in the seventeenth century had opposed the speculative natural philosophers and the medico-chemists of the Paracelsus type, and had attempted to separate chemistry from alchemy. In the eighteenth century, one of the chief interests in chemistry was the resolving of bodies into their component parts, studying their characteristics and properties, and combining various elements. The works of the followers of Paracelsus were, however, still of interest. In a letter⁶² to Karoline Schlegel in September, 1798, Novalis asks for Joh. Baptist van Helmont's⁶³ and

61. *Ibid.*, S.424 f.

62. *Ibid.*, Bd.4, S.238.

63. (1577-1644). He was the first to introduce the idea of ferments into chemistry.

Robert Fludd's⁶⁴ works. Both were Paracelsus scholars and followers. Volta's experiments led to "discoveries," but there were still the "mysteries" of electricity to solve, to which the nineteenth century brought the solutions. Newton's⁶⁵ work had revolutionized physics, as well as astronomy, and had shown conclusively that facts of nature could be represented definitely--even though his ultimate theory is mystical--and yet at the end of the eighteenth century and the beginning of the nineteenth century there was rampant speculation connected with scientific endeavor, and especially with galvanic, magnetic, and electrical action. The nature of electricity and magnetism and their relationship to light and heat were much speculated about. The two were at first characterized as fluids, twofold in character, positive and negative. Gravity and heat, also fluids, were opposites. The one was contractile and the other expansive. One of the most imaginative of scientists, Erasmus Darwin, accepted the many similarities between magnetism and electricity, and accepted as very probable the existence of two magnetic ethers and two electric ones. And both, he said, originated from the earth, the arctic "ether" being at one pole of the magnet and the antarctic at the other. It is true that Darwin believed in the experimental value of daring hypothesis, but Newton who emphasized the inductive method in scientific research, also had put forth a hypothesis of a luminiferous ether, which was to explain the phenomena of light and gravitation, and partially, of electricity

64. (1574-1637). His best known works in Germany were Historia makro-et mikrokosmi and Clavis philosophiae et alchymiae.

65. Whom Novalis in a letter to Professor Reinhold, already in 1791, put among those great men who during that period were being forgotten or whose worth was being greatly underestimated. Novalis' Schriften (Kluckhohn), Bd.4, S.24.

and magnetism, as well as the constitution of matter. The metaphysical implication of such a theory of a primal ether, in the end would be the element holding Novalis' ultimate interest, because he could link it up with himself personally, and with the infinite. In an attempt⁶⁶ to express the difference between Leibniz' manner of presenting a computation of the infinite and that of Newton, he describes it as basically the same as the difference between the atomic and the ethereous or vibration⁶⁷ theories. During the earlier part of the Freiberg period Novalis considered all the possible relationships: whether magnetism is to gravity as electricity is to heat;⁶⁸ that there could be no electricity without magnetism and no magnetism without electricity;⁶⁹ that the magnet is reversed electricity and electricity reversed magnetism, and that possibly magnetism is in the relationship to light as electricity is to heat;⁷⁰ that if chemistry is the theory of the modification of heat, then its connection with electricity and even galvanism would not be surprising;⁷¹ that chemistry is galvanism of inanimate nature.⁷² In the end, however, the important question is whether "the ether" has "a duplicate" within us:

Sollte es nicht ein Vermögen in uns geben,
was dieselbe Rolle hier spielte, wie die Feste
ausser uns—der Äther—jene unsichtbar sichtbare
Materie, der Stein der Weisen—der überall und
nirgends, alles und nichts ist—Instinkt oder
Genie heissen wir sie.—Sie ist überall vorher.
Sie ist die Fülle der Zukunft—die Zeitenfülle
überhaupt—in der Zeit, was der Stein der Weisen
im Raum ist—.....⁷³

66. Novalis' Schriften (Kluckhohn), Bd.3, S.229, 853.

67. Newton described ether as an elastic medium capable of vibrations.....

68. Novalis' Schriften (Kluckhohn), Bd.3, S.29, 62.

69. Ibid., S.35, 89.

70. Ibid.

71. Ibid., S.249, 950.

72. Ibid., Bd.2, S.408, 457.

73. Ibid., Bd.3, S.259, 1037.

Galvanistic and electrical phenomena had stirred up with renewed vigor the question as to the relationship of organic and inorganic matter, especially since the similarities with chemical processes were attracting so much attention. In one fragment⁷⁴ Novalis lists some of Ritter's laws, discoveries, conjectures, observations, hypotheses, and so on; among these, "his galvanism in inorganic nature." Novalis accepts the fact that in oil, sugar, and ammonia there are to be found particular combinations with animal matter; if these could be combined and stimulated by a sperm, one could possibly produce animal beings--with the help of electricity and galvanism.⁷⁵ If galvanism increases all functions of individual substances, it might possibly be "ein innres Licht," a trace of feeling in the inorganic realm, a higher consciousness in nature. And then the dissimilarity between combinations in chemistry and organic chemistry may be only that in the first the elements involved become one, really mix, while in the latter case, the elements are merely set aside forming a combined mass.⁷⁶

Novalis hailed Schelling as "der Philosoph der neuern Chemie," "der absolute Oxygenist,"⁷⁷ who

74. Ibid., S.46, 147.

75. Ibid., S.31, 75.

76. Ibid., S.28, 59: "Sollte die Unähnlichkeit zwischen chemischen und organisch chemischen Verbindungen nur die sein, dass im ersten Falle die heterogenen Wechselglieder eins werden--sich wirklich selbst vermischen--hingegen im letztern Falle nur eine gegenseitig sich mischende Masse absondern--? (Freilich wird die Masse und die Mischung selbst in dieser höhern Einheit und Gattung anders modifiziert, das liegt schon im Begriff der Ähnlichkeit.)" Cf. Bd.2, S.423 for a definition of "eine echte Mischung"-- A third element comes into existence which is at the same time both the elements of which it is composed and also more than all of them singly.

77. Ibid., S.84, 139.

combines two chemical philosophies. In one, nature would be an endlessly modified oxygen, in the other an endlessly modified nitrogen. The one might be called meteorological physics or chemistry, the other geological chemistry.⁷⁸ In the first, oxygen and hydrogen form the bases for the mineral and metal kingdoms, in the second carbon and nitrogen the bases for the vegetable and animal kingdoms. And these two, inorganic and organic chemistry, are combined by a galvanic chemistry.⁷⁹ As a chemist, however, Schelling is to be criticized. He proceeds, says Novalis, from the phenomena of stimulation and irritation, based on muscular fibre, forgetting much else, such as blood and vegetable fibre. A chemist should proceed from nature's own processes.

Dr. Priestley even in 1800 was still defending phlogiston and dephlogisticated air. Novalis evidently in 1798 still accepted this invisible substance showing itself as a flame. He refers to it when he speaks of irritation and the capacity for being irritated. Irritation and capacity stand in relationship to each other as do oxygen and phlogiston.⁸⁰ Only once more is it mentioned:

Der Begriff Materie, Phlogiston, Oxygen, Gas, Kraft etc., gehören in eine logische Physik--die nichts von konkreten Stoffen weiss--sondern mit kühner Hand eigensinnig in das Weltchaos hineingreift--und eigne Ordnungen macht.....⁸¹

The general question what kind of qualities "a flame" has, interested him longer. It again offered him something which started in him "interessante

78. Evidently pointing back to the broad term "natural history," including all sciences dealing with life and with the structure of the earth.

79. Novalis' Schriften (Kluckhohn), Bd.3, S.84, 139.

80. Ibid., Bd.2, S.345.

81. Ibid., Bd.3, S.49.

Gedankenfolge." It separates that which is combined, and combines that which is separated. It composes and decomposes, he says, it oxidizes and deoxidizes, it magnetizes and demagnetizes, it electrizes and deelectrizes.⁸² Then comes the question whether a flame might be galvanic action. Perhaps again product of its product.⁸³ He speaks of water as "eine nasse Flamme."⁸⁴ Novalis wrote in one fragment:

Ein gutes physikalisches Experiment kann zum Muster eines inneren Experiments dienen und ist selbst ein gutes innres subjektives Experiment mit.⁸⁵

An application of this seems to be his designation of that substance which results from reciprocally related, simultaneous speaking and thinking, "active contemplation," as "a flame," which harmoniously fashions and stimulates both.⁸⁶ When light, electricity, and magnetism were being thought of as fluids, a sharp distinction between the material and immaterial was impossible. The English poet, Shelley, who has been described as having had "a scientist's grasp and the imagery of a poet,"⁸⁷ wrote of these three "substances" as follows:

.....like thought they are sometimes the cause and sometimes the effect of motion; and, distinct as they are from every other class of substances, with which we are acquainted, seem to possess equal claims with thought to the unmeaning distinction of immateriality.⁸⁸

82. Ibid., S.40, 119.

83. Ibid., S.41, 123.

84. Ibid., S.258, 1027.

85. Ibid., S.229, 855.

86. Ibid., S.170, 617: "Gegenseitig bezognes, simultanes Sprechen und Denken (tätiges Betrachten) tut Wunder—erzeugt eine Substanz (Flamme), die beides, Sprechen und Denken, harmonisch bildet—und erregt."

87. Carl Grapo—A Newton among Poets, Shelley's Use of Science in Prometheus Unbound, p. 135.

88. Ibid., p. 142.

So we can say that even though Novalis' imagination often carried him further than a conservative scientist of that period would go, his imaginative conceptions were nevertheless not necessarily unsound.

Most of Novalis' comments in his fragments of this period concerning geology or geognosy come under the heading "Enzyklopädistik." It was during the second half of the Freiberg period that Novalis was putting a very great deal of his time and effort into his introduction to a work which was to be "eine echte Enzyklopädistik." Much of the material to be used in this great work is naturally found in "Das allgemeine Brouillon." Novalis describes the former work in a letter to Friedrich Schlegel in November, 1798. He writes:

Ich denke hier Wahrheiten und Ideen im grossen—genialische Gedanken zu erzeugen--ein lebendiges, wissenschaftliches Organon hervorzu- bringen—und durch diese synkritische Politik der Intelligenz mir den Weg zur echten Praxis--dem wahrhaften Reunionsprozess--zu bahnen.⁸⁹

The comparatively scant comments in the field of geology do not fully indicate the strong interest Novalis took in Abraham Gottlob Werner's teaching and theory. Die Lehrlinge zu Sais and Heinrich von Ofterdingen give us the appreciative memorial of which Novalis felt his teacher worthy. Definitions and distinctions comprise most of the fragment material in this field of study. Geognosy is that part of geology treating of the materials of the earth and its general exterior and interior constitution, oryctognosy the science of the differentiation between the simple minerals. Oryctognosy is really mineralogy, a subdivision, along with paleontology, of oryctology, the science of things dug up from the

89. Novalis' Schriften (Kluckhohn), Bd.4, S.240 f.

earth. Novalis was accustomed to use the term "Fossilien." "Geognosie," he writes,

ist die Lehre von den Verwandtschaften der Fossilien. Oryktognosie ist die Lehre von den Verwandtschaften (der äussren Merkmale) der Fossilien.⁹⁰

On this science, he says, the mineralogical system of classification is based. Then comes the science of chemical mineralogy which concerns itself with the ingredients of minerals and the changes.⁹¹ Closely connected with this science is mineralogical chemistry, the science of the relationship of the mineral ingredients, the technical chemical relationship.⁹² All these sciences which have any connection with the mineral kingdom might be properly divided and organized under what Novalis calls "eine philosophische Mineralistik," accompanied by a comprehensive system of classification.⁹³ According to Novalis, a great many of the so-called sciences are not sciences at all.⁹⁴ They are arts. Their heterogeneous scientific elements have been drawn together around an artificial center and called "sciences," whereas one is dealing with arts or trades, any of which make use of various scientific instruments. Novalis cited as examples the mining industry and the salt-industry, "der Bergbau und die Salinistik," often termed sciences. Their object merely happens to be a miscellaneous scientific task.⁹⁵

90. Ibid., Bd.3, S.187, 668.

91. Ibid.

92. Ibid.

93. Ibid. Novalis feels that the effort at classification in botany and zoology is much more complicated than in mineralogy. The greater individuality in plants and animals makes a rather complete classification according to one main organ possible, but nevertheless the classification remains quite incomplete.

94. Novalis' Schriften (Kluckhohn), Bd.3, S.76, 95.

95. Ibid.

Hutton's doctrine of uniformitarianism which he had advanced in 1795, started active geological research. Two camps arose. The Huttonians or Plutonists or Volcanists gave greater stress to the part internal fire had played in the development of the earth, which was estimated to have been in existence for six thousand years. The Wernerians or Neptunists gave greater importance to a primeval ocean as an explanation for the formation of the earth's surface. Novalis' acceptance of the Wernerian theory was poetically expressed in 1798 in the following passage from Glauben und Liebe oder Der König und die Königin:

Es war kein Wunder, wenn die Bergspitzen meistens nur auf die Täler herabdonnerten und die Fluren verwüsteten. Böse Wolken zogen sich meist um sie her und verbargen ihnen ihre Abkunft vom Lande; dann erschien ihnen die Ebene nur wie ein dunkler Abgrund, über welchen sie die Wolken zu tragen schienen, oder wie ein empörtes Meer, da doch nichts eigentlich gegen sie empört war und sie allmählich abstumpfte und herunterwusch als die anhänglich scheinenden Wolken.⁹⁶

In the "Studienhefte" Novalis admitted that water by all means was primary in the formation of the earth's surface,⁹⁷ but in "Das allgemeine Brouillon" he speaks of revolutions. The oldest "fossils"⁹⁸ bear the stamp of the greatest revolutions. The newer they are, the more quietly did they come into existence.⁹⁹ The first revolutions, says Novalis, were simple, but violent.

96. Novalis' Schriften (Kluckhohn), Bd.2, S.49, 8.

97. Ibid., Bd.3, S.39, 114.

98. For meaning of "Fossilien" cf. Novalis' Schriften (Kluckhohn), Bd.3, S.77, 101—"Mineralogie. Steine in Potenzen--spezifisch verschiedene Fossilien--dem Grad nach verschiedene Steine."

99. Ibid., S.184, 660.

"Grundrevolutionen," he calls them.¹⁰⁰ The following were not as violent and were varied. The most recent were revolutions of the surface; they were partial, local, and the products rather only variations of the older products.¹⁰¹ The most recent and peaceful times have produced few wonderful formations, and the newest layers of earth contain few minerals. Novalis mentions the existing geological controversy in the "Paralipomena zu den 'Lehrlingen zu Sais,'" in which he writes:

Der geognostische Streit der Vulkanisten
und Neptunisten ist eigentlich der Streit: ob die
Erde sthenisch oder asthenisch debütiert habe.¹⁰²

Next we turn to astronomy which Novalis once said must become the foundation for all physical sciences.¹⁰³ This assertion can be accepted as true, since Newton's three laws of motion, resulting from demonstrations of the intricate movement of the solar system, have become basic in all research in the physical sciences. Somewhat earlier Novalis also wrote: "Alle Wissenschaften sollen Mathematik werden."¹⁰⁴ Pure mathematics in its origin was a part of natural science, for it attempted to deal with certain aspects of the perceptual world, but very rapidly became a more deductive science than any other natural science. And now the other branches of science have reached stages in which they need the help of mathematics and mathematical methods.¹⁰⁵ The following "fragment" of Novalis, of course, carries its train of thought too far:

100. Ibid., S.184, 662.

101. Ibid., S.184, 662.

102. Novalis' Schriften (Kluckhohn), Bd.1, S.41.

103. Ibid., Bd.3, S.267, 1106.

104. Ibid., S.18, 17.

105. E. W. Hobson—The Domain of Natural Science—p. 49 f.

Am Ende ist die ganze Mathematik gar keine besondere Wissenschaft—sondern nur ein allgemein wissenschaftliches Werkzeug--ein schönes Werkzeug ist eine Contradictio in adjecto. Sie ist vielleicht nichts als die exoterisierte, zu einem äusseren Objekt und Organ gemachte Seelenkraft des Verstandes--ein realisierter und objektivierter Verstand. Sollte dieses vielleicht mit mehreren und vielleicht allen Seelenkräften der Fall sein--dass sie durch unsre Bemühungen äusserliche Werkzeuge werden sollen?-- Alles soll aus uns heraus und sichtbar werden--unsre Seele soll repräsentabel werden.--Das System der Wissenschaften soll symbolischer Körper (Organsystem) unsers Innern werden.--.....¹⁰⁶

It was Johann Kepler's work which formed the foundation upon which Newton could build, but Copernicus' idea of a heliocentric constitution of the solar system had pointed the way astronomy was to develop. In the Copernican astronomy that which interested Novalis most was the idea of "mobility,"¹⁰⁷ for again he could get into the metaphysical world. He writes:

Die Philosophie macht alles los, relativiert das Universum. Sie hebt wie das Kopernikanische System die festen Punkte auf--und macht aus dem Ruhenden ein Schwebendes.¹⁰⁸

Just as Copernicus righted a prevailing error in astronomy, so Kant played the role of Copernicus in that he declared the empirical ego to be a planet along with the external world and placed the center of the system in the moral code or ego.¹⁰⁹ And

106. Novalis' Schriften (Kluckhohn), Bd.3, S.71, 67.

107. Reflection on the mobility of the earth started Copernicus' great discovery that the earth revolved on its axis, and that the earth with the moon encircling it traverses a great circle in its annual motion among the planets about the sun.

108. Novalis' Schriften (Kluckhohn), Bd.3, S.221, 824.

109. Ibid., S.182 f., 655.

"Fichte Newton" he calls the law-giver of the inner astronomical system.¹¹⁰ Novalis seemed to stand a bit in awe of the immense heavenly bodies and their "system of life." In Die Lehrlinge zu Sais he writes that he does not know whether anyone as yet has really understood "stones and stars," but at any rate, if there has been anyone, that being must have been a sublime being.¹¹¹ Surely, he muses, when the golden age returns, the celestial bodies will again visit the earth toward which they have become ill-disposed, then the sun will put aside its stern sceptre and become again a star among the stars.¹¹²

Novalis was aware of the old hypothesis that the comets were the torches starting off the revolutionary changes in the astronomical system, and accepted it as valid in connection with another kind of comets, which periodically revolutionize and rejuvenate the spiritual "astronomical system." The spiritual astronomer, writes Novalis in Glauben und Liebe,¹¹³ has for long been noticing the influence of such a comet upon a considerable part of the spiritual planet, which we call human nature. Mighty floods,

110. Ibid.

111. Ibid., Bd.1, S.33: "'.....—Ob jemand die Steine und Gestirne schon verstand, weiss ich nicht, aber gewiss muss dieser ein erhabnes Wesen gewesen sein. In jenen Statuen, die aus einer untergegangenen Zeit der Herrlichkeit des Menschengeschlechts übriggeblieben sind, leuchtet allein so ein tiefer Geist, so ein seltsames Verständnis der Steinwelt hervor, und überzieht den sinnvollen Betrachter mit einer Steinrinde, die nach innen zu wachsen scheint. Das Erhabne wirkt versteinern, und so dürften wir uns nicht über das Erhabne der Natur und seine Wirkungen wundern, oder nicht wissen, wo es zu suchen sei. Könnte die Natur nicht über den Anblick Gottes zu Stein geworden sein? Oder vor Schrecken über die Ankunft des Menschen?'"

112. Ibid., S.18.

113. Ibid., Bd.2, S.51, 15.

climatic changes, fluctuations of the center of gravity, general tendencies toward dissolution, and strange meteors are the symptoms of this violent upheaval, the results of which will determine the purport of a new age.¹¹⁴

Novalis saw clearly, when he stated the difference between Werner, the collecting, systematizing investigator whom he respected, and himself, in the fragment Die Lehrlinge zu Sais: "So wie dem Lehrer ist mir nie gewesen. Mich führt alles in mich selbst zurück....."¹¹⁵ And yet he also recognized clearly what he called, "die Pflicht des wissenschaftlichen Anfängers":

Erst muss er mechanisch fertig werden, dann kann er anfangen nachzudenken....Das voreilige Denken hält mehr auf, als dass es befördert. Diese Pflicht des wissenschaftlichen Anfängers gehört zu der allgemeinen Pflicht, seine Vernunft gefangen zu nehmen.--Auch diese Gefangennehmung kann zur Kunst werden.¹¹⁶

Very few become genuine experimenters. It takes genius. A real experimenter must have within himself an obscure feeling for nature, which, the more developed his aptitudes are, will the more surely lead him on his way and will the more accurately help him distinguish the decisive phenomena.¹¹⁷ The investigator must begin somewhere, with an original belief

114. Ibid.

115. Ibid., Bd.1, S.13.

116. Ibid., Bd.3, S.65 f., 45.

117. Ibid., S.75 f., 94: "Wie wenig Menschen haben Genie zum Experimentieren. Der echte Experimentator muss ein dunkles Gefühl der Natur in sich haben, das ihn, je vollkommener seine Anlagen sind, um so sicherer auf seinem Gange leitet und mit desto grösserer Genauigkeit

or will, "mit einem Urglauben oder Urwillen."¹¹⁸ Knowledge "in the distance," Novalis says, is belief.¹¹⁹ The desire for knowledge is a strange mixture of mystery and knowledge.¹²⁰ To gain knowledge means to be again confronted with something unknown. The unknown, the mysterious, is the result and the beginning of everything. "Die Erkenntnis," writes Novalis, "ist ein Mittel, um wieder zu Nichterkenntnis zu gelangen.....Die Natur ist unbegreiflich per se."¹²¹ Empirical and speculative investigation are both infinite, but the true seeker follows both. Perhaps philosophy should always be "nur eine höhere Potenz der Wissenschaftlichkeit."¹²²

The intensive period of study in Freiberg came to a close in May, 1799, and Novalis returned to Weissenfels. During the last months, he was particularly occupied with the study of technical mining problems, for he felt that his years of apprenticeship

(Footnote continued)

das versteckte entscheidende Phänomen finden und bestimmen lässt. Die Natur inspiriert gleichsam den echten Liebhaber und offenbart sich um so vollkommener durch ihn--je harmonischer seine Konstitution mit ihr ist. Der echte Naturliebhaber zeichnet sich eben durch seine Fertigkeit, die Experimente zu vervielfältigen, zu vereinfachen, zu kombinieren und zu analysieren, zu romantisieren und polarisieren, durch seinen Erfindungsgeist neuer Experimente--durch seine naturgeschmackvolle oder natursinnreiche Auswahl und Anordnung derselben, durch Schärfe und Deutlichkeit der Beobachtung und artistische sowohl zusammengefasste als ausführliche Beschreibung oder Darstellung der Beobachtung aus. Also--Auch Experimentator ist nur das Genie."

118. Ibid., S.203, 727.

119. Ibid., S.216 f., 803.

120. Ibid., S.152, 502.

121. Ibid., S.111, 312.

122. Ibid., S.95, 225.

were coming to an end.¹²³ The demands of professional life, of a responsible position were soon to be met. He was planning to return to Weissenfels, again as assistant to the board of mining directors.

123. Ibid., Bd.4, S.263--In a letter to Karoline Schlegel in January, 1799.

LAST YEARS IN WEISSENFELS

When Novalis returned to Weissenfels in the spring of 1799, a new period in his life began. The period of formal study was over; the next years were to be devoted to administrative and research duties in connection with the salt-industry. Documents, records, and official letters¹--a great many still unpublished--show how exacting his duties were and how ably he performed them. Official documents concerning Novalis' connection with the salt-works in Saxony were in the possession of the Board of Mines in Halle until they were transferred to Prussia in 1815, when the magistracy of the district Thüringen was changed. Records of Novalis' application for the position as one of the chief administrative officials in the province of Thüringen are found in the "Hauptstaatsarchiv" in Dresden.

During the year in Tennstedt, Novalis had laid the foundation for his conception of what a profession entailed, of what practical work meant. In Wittenberg, Novalis said he had learned to apply himself to unpleasant and painstaking tasks.² In

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1. Cf. Richard Samuel's "Der berufliche Werdegang Friedrich von Hardenbergs" (Deutsche Vierteljahrsschrift für Literaturwissenschaft und Geistesgeschichte), S.83-112. There are listed in this article three points under what are classed as "allgemeine Obliegenheiten" and ten under "besondere Obliegenheiten" when the "Instruktion für den Assessor bei der Lokalsalinendirektion George Philipp Friedrich von Hardenberg" is made out. *Ibid.*, S.102 f. Cf. also Novalis' Schriften (Kluckhohn), Bd.4, S.297-311, 312-322, 336-342.
 2. Novalis' Schriften (Kluckhohn), Bd.4, S.318.

Tennstedt this ability was strengthened. Kreisamtmann Just in his "Biographie des Novalis," describes the accuracy of the young man's work, his attempt to do justice to every phase of his work, and his untiring effort.³ Novalis had shown in Tennstedt already, that his professional work did not need to be neglected, even though his personal tastes and tendencies were given full rein a part of each day, during the "Nebenstunden." It was in the second period at Weissenfels, during Novalis' last two years, while professional activity was claiming each working-day, that his subjective soul-experiences finally found beautiful lyric expression. "Im geheimen als Nebenarbeit," as he says, the "Hymnen an die Nacht" and the "Geistlichen Lieder" and the poems in "Heinrich von Ofterdingen" rapidly followed each other, and "Die Christenheit oder Europa" was written in close connection. In his fragments also, poetry was now given more consideration. After October, 1800, there are no "fragments," no "day-book" records. Death came to Novalis in March, 1801, soon after he received his appointment as chief administrative official.

After a tour of inspection under the direction of Geh. Finanzrat Jul. Wilh. von Oppel during the latter part of May, 1799, Novalis assumed the full responsibility of a member of the board of directors. He then made official tours of the mines at Artern, Kösen, and Dürrenberg. In July Novalis' father sent a formal petition to Dresden, asking that his son be appointed officially to the salt-works. In December a summons was sent from Dresden that Novalis enter upon his new office as an assistant. Then in April of the following year Novalis put in a petition for appointment as one of the chief administrative officials. In the meantime he was spending his days supervising the various mines, working over the budgets of the various factories, inspecting new

3. Ibid., S.423 f.

additions and enlargements, visiting foreign works, and supplementing his own knowledge. Various trips are recorded. With Kreisamtmann Just, Novalis inspected the alum factory in Hohenebra.⁴ In the summer of 1800 he spent more than a month making "eine grosse mineralogische Reise" through Thüringen.⁵ In September the "Probeschrift für die Amtshauptmannstelle" was sent to Dresden, and in December of this year he was appointed "Supernumeraramtshauptmann im Thüringischen Kreise." However, several months earlier, in August, the fatal illness had already seized him, and he died the next spring just as an active official life was opening before him.

In May of the year 1799, Novalis began his work with the hope of becoming a useful technician in the occupations, for which he had been preparing himself in Freiberg.⁶ Always he stressed his desire to be judged by his practical life. He wanted to be recognized as useful, active, and faithful. In January, 1800, he wrote to Just as follows:

.....Die Schriftstellerei ist eine Nebensache. Sie beurteilen mich mehr billig nach der Hauptsache—dem praktischen Leben.....Ich behandle meine Schriftstellerei nur als Bildungsmittel. Ich lerne etwas mit Sorgfalt durchdenken und bearbeiten—das ist alles, was ich davon verlange.....Nach meiner Meinung muss man zur vollendeten Bildung manche Stufen übersteigen—Hofmeister, Professor, Handwerker sollte man eine Zeitlang werden, wie Schriftsteller.....⁷

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4. Cf. Novalis' Schriften (Kluckhohn), Bd.4, S.340 f. for his professional opinion concerning methods of manufacture here in Hohenebra.
 5. Various reports resulted: "Bericht über die enklavierten ausländischen Ortschaften und der ihnen konzedierte freien Salzerhebung;" "Bericht über Kohlenförderung zu Knapendorf;" "Geognostische Notizen über den Bezirk."
 6. Novalis' Schriften (Kluckhohn), Bd.4, S.284.
 7. Ibid., S.329.

Geh. Finanzrat von Oppel, whom Novalis spoke of as "einen sachverständigen Mann," had spoken in his behalf when the petitions went in to Dresden, and from December, 1799, on, Novalis addressed long letters to him, reporting and suggesting ideas in connection with his work. Novalis kept the records of the board meetings, he worked over the budgets, presented reports of various kinds, and in addition was presenting extensive plans for further improvements in the whole salt industry. For it was Novalis' work to bring to the attention of the directors all deficiencies, to discover new lignite beds, to make the necessary arrangements for new coal contracts, to visit the extant pits, and to supervise the chemical factories, the lime-kilns and tile-kilns. In December, 1799, he was reporting to Herr von Oppel that he had made an exhaustive study of the whole lignite industry,⁸ that he was collecting geognostic facts on every trip,⁹ and at the same time he was drafting a report concerning the appointment of managers and foremen for the Saxon salt-works, and concerning the division of directorial work among the members of the governing board.¹⁰ In 1800 while he was waiting for the advanced appointment, he prepared a paper concerning the condition and possible improvement of the Thuringian province. No end of work and plans filled Novalis' days,¹¹ but nevertheless he still found time to give to those "Jenseitsstrebekräfte" roused by the Sophie experience, and to create poetic masterpieces. His good friend Just recognized the amount of work Novalis was attempting to do. After Novalis' death Just recalled, as he wrote, that among other things Novalis was collecting metecrological data in

8. Ibid., S.298.

9. Ibid., S.299.

10. Ibid., S.302 f. Cf. Samuel's "Der berufliche Werdegang Friedrich von Hardenbergs," S.97.

11. The "Tagebücher," especially during the summer of 1800, suggest how varied are his interests--Bd.4, S.407 f.

order to bring the refinement of brine to a higher standard, that he was investigating the manufacture of salt as a student of fiscal questions, as well as from a technical and chemical standpoint. Just parried the question whether Novalis accomplished anything really lasting, by continuing:

Man frage nicht, was er in diesem Fache vorzüglich geleistet hat? Wer in den Lehrjahren stirbt, von dem kann man nur forschen und ahnen, was er in den Jahren des Meisters geleistet haben würde. Tief trauerte daher um ihn der Bergrat Heun, wenn er kurz nach seinem Tode zu mir sagte: 'O, Sie wissen nicht, was wir an ihm verloren haben!'..... Seine Freunde trauern um ihn, und die ihn genauer kannten, betrachten, wie ich oben sagte, seinen Tod als einen Verlust für die Wissenschaft und für die Menschheit.¹²

The "Fragmente der letzten Jahre" contain, besides medical notations, much that is related to his own work. In the field of natural science, physical and chemical phenomena and their possible connections with his mining interests were emphasized during this last period. Physics particularly held the center-ground.¹³ Ultimately with its help a great cosmic picture was to be developed. In Christenheit oder Europa Novalis speaks of "das Höchste in der Physik" as being now at hand.¹⁴

12. Novalis' Schriften (Kluckhohn), Bd.4, S.433 f.

13. In Ludwig Tieck's "Bericht über die Fortsetzung" of the novel Heinrich von Ofterdingen, we are told that Novalis intended--in one of the seven novels he planned--to present his opinions and convictions in the field of physics, just as in Heinrich von Ofterdingen his poetic views find expression. Cf. Novalis' Schriften (Kluckhohn), Bd.1, S.250.

14. Novalis' Schriften (Kluckhohn), Bd.2, S.81.

During this period Novalis occasionally came in contact with Henrik Steffens; the influence of Franz von Baader¹⁵ was still strong; and the friendship with Johann Wilhelm Ritter developed.¹⁶ Baader's nature philosophy easily led to the interpretation of the world as an animated organism with forces of a psychic nature. The strong emphasis on the unity of all nature and the acceptance of one primary force in all organic and inorganic nature appealed to Novalis, because his own notions were confirmed. Novalis could agree with the scientist Ritter who had a place in "science" for "Gefühl." Ritter in 1798 wrote:

.....Denn bleibt uns wohl bey aller Erfahrung etwas anderes, als unser Gefühl, unser subjectives Gefühl übrig? Sollte dieses also, wenn es nur rein gefühlt wird, nichts gelten, so wäre wohl unsere ganze sinnliche Erfahrung Täuschung. Dann aber weiss ich nicht, wie es um Erfahrungswissenschaften überhaupt aussehen möchte.¹⁷

It was also the physicist Ritter's belief in the unity of nature, in "ein organisches All," likewise expressed in Beweis dass ein beständiger Galvanismus den Lebensprozess in dem Tierreich begleite, which conformed entirely to Novalis' convictions. Very eagerly he caught at the idea that galvanism might be a phenomenon explaining the riddle of life, and sought to carry it over into the realm of the spirit.

15. (1765-1841); Baader saw all that was immaterial reproduced in the material. He perceived in all phenomena in nature a primary force. He called love "das allgemeine Band, das alle Wesen im Universum in=und aneinander bindet und verwebt."
16. In memory of this friendship Ritter wrote his last work, Fragmente aus dem Nachlasse eines jungen Physikers.
17. Beweis, dass ein beständiger Galvanismus den Lebensprozess in dem Thierreich begleite--S.105.

Novalis once wrote that the assumption that thinking also might be galvanism, could be made to seem very plausible--and yet much could be said about it, as he puts it, "hin und her--gerade und verkehrt."¹⁸ Novalis was still very much interested in the many possible conjectures concerning this and related phenomena. He noted "tierisch magnetische Versuche."¹⁹ He made comparisons: that animal magnetism is to magnetism what galvanism is to electricity, that perhaps galvanism is merely animal electricity. At the same time he showed how each of these--chemistry, magnetism, and electricity--is of three kinds, mineralogical, vegetable, or animal.²⁰ Later it appeared to Novalis as though electricity, magnetism, galvanism were certainly universal, abstract formulas of the manifoldly manifested chemical "processes" of nature.²¹ The anatomist Johann Christian Reil used a similar explanation to represent his idea of unity. Everywhere he saw physical forces at work. The more individualized manifestations indicated vital energy, of which the first indication was crystallization. This was followed by the vegetative "force," the product of which is plant-life. Then came the animal force, governing the animal-kingdom. This force at first manifests itself as muscular movement, and finally as the power of reason. All of these forces, however, were merely properties of matter of various kinds; all were "forces of nature," at different stages, more or less perfected and "vital." Thus Novalis again got to the line of thought which always intrigued him. Here also can be applied what he said of physics as a whole:

18. Novalis' Schriften (Kluckhohn), Bd.3, S.285, 16.

19. Ibid., S.332, 364.

20. Ibid., S.308, 4.

21. Ibid., S.341, 412.

.....Jedes Phänomen ist ein Glied einer unermesslichen Kette--die alle Phänomene als Glieder begreift. Die Naturlehre muss nicht mehr kapitelweise--fachweise behandelt werden. --Sie muss (ein Kontinuum) eine Geschichte--ein organisches Gewächs--ein Baum werden--oder ein Tier--oder ein Mensch.²²

This idea of a growing, changing, developing world was gaining greater recognition as being important in the explanation of natural phenomena. This idea of "evolution" or development was strongly championed by Erasmus Darwin during the last years of the eighteenth century, and such an idea very naturally appealed to the so-called "nature philosophers," even though the strictly mathematical-mechanical, physical scientist might have hesitated to accept it. This hesitation grew less as the scientific investigator came to accept the element of time in his explanations. Novalis mentioned Darwin in Blütenstaub, and undoubtedly was aware of the concept of a developing world. The following words in Heinrich von Ofterdingen have been pointed out as expressing the idea of metamorphosis or evolution in nature:

Mag es sein, dass die Natur nicht mehr so fruchtbar ist, dass heutzutage keine Metalle und Edelsteine, keine Felsen und Berge mehr entstehen, dass Pflanzen und Tiere nicht mehr zu so erstaunlichen Grössen und Kräften aufquellen; je mehr sich ihre erzeugende Kraft erschöpft hat, desto mehr haben ihre bildenden, veredelnden und geselligen Kräfte zugenommen, ihr Gemüt ist empfänglicher und zarter, ihre Phantasie mannigfaltiger und sinnbildlicher, ihre Hand leichter und kunstreicher geworden. Sie nähert sich dem Menschen, und wenn sie ehemals ein wildgebärender Fels war, so ist sie jetzt eine stille,

22. Ibid., S.327, 313.

treibende Pflanze, eine stumme menschliche
Künstlerin.²³

In one of his last poems, "Es färbte sich die Wiese grün," Novalis also followed the same line of thought. One of the stanzas follows:

Vielleicht beginnt ein neues Reich,
Der lockre Staub wird zum Gesträuch,
Der Baum nimmt tierische Gebärden,
Das Tier soll gar zum Menschen werden.
Ich wusste nicht, wie mir geschah,
Und wie das wurde, was ich sah.²⁴

Whether Novalis here was consciously pointing to evolution as we have come to accept it since Charles Darwin's time, remains rather questionable. As in Goethe, it was probably merely the concept of "growth" and "unity," of gradation and perfection, which intrigued Novalis. The type of science Erasmus Darwin pursued gave limitless freedom to the imagination. And it is quite natural that by a poetic soul, that element in science which appeals to the imagination, is snatched at. That is why electricity and magnetism with their appeal to the imaginative mind received such consideration. In "Nachlese" one of the fragments ends thus: ".....Sollte nicht jeder Pflanze ein Stein und ein Tier entsprechen? Pflanzen sind gestorbene Steine, Tiere gestorbene Pflanzen."²⁵ The "Paralipomena" to Heinrich von Ofterdingen contain similar suggestions. Heinrich becomes "Blume, Tier, Stein--Stern."²⁶ And there are

23. Ibid., Bd.1, S.166—Ralph B. Crum in Scientific Thought in Poetry refers to these words in his chapter "Poetry champions evolution: Goethe," p. 145.

24. Ibid., S.357.

25. Ibid., Bd.3, S.369 f., 10.

26. Ibid., Bd.1, S.241.

various changes suggested at the very end in connection with Heinrich's possible experiences.²⁷ All of these "changes" were, however, entirely in keeping with the fundamental idea of "das ewige Werden," the idea of growing, developing, and interlinking, which Novalis associated with "evolution" in another connection, politically, in Die Christenheit oder Europa, when he wrote:

Überdem haben wir ja mit Zeiten und Perioden zu tun, und ist diesen eine Oszillation, ein Wechsel entgegengesetzter Bewegungen nicht wesentlich? und ist diesen eine beschränkte Dauer nicht eigentümlich, ein Wachstum und ein Abnehmen nicht ihre Natur? aber auch eine Auferstehung, eine Verjüngung, in neuer, tüchtiger Gestalt, nicht auch von ihnen mit Gewissheit zu erwarten? Fortschreitende, immer mehr sich vergrößernde Evolutionen sind der Stoff der Geschichte.--Was jetzt nicht die Vollendung erreicht, wird sie bei einem künftigen Versuch erreichen oder bei einem abermaligen;.....²⁸

All these references to change, development and relationship, seem to have a closer connection with the old "chain of being" theories. Even Charles de Bonnet,²⁹ investigator of nature and philosopher, still arranged all products of nature without any consideration of time. His purpose was to show that no "link" was missing, that nowhere could be found a break in the chain, so perfectly nature had wrought her work.

27. Ibid., S. 247.

28. Ibid., Bd.2, S.70. Interesting in this connection is Browning's interpretation of evolution later as the law of life. In his optimistic philosophy of life, evil resulted when this development in nature was hindered.

29. (1720-93); Mentioned once by Novalis. Cf. Schriften (Kluckhohn), Bd.2, S.332, 74. He notes Bonnet's remark: "Aufmerksamkeit ist Mutter des Genies."

Such speculation as this, however, Novalis left for his spare hours. His professional duties had no place for such thought. Exact practical application of technical facts was required there, and Novalis could meet the requirements. He explained facts thoroughly, he presented observations in detail, he worked out causes and results carefully, and could set forth ideas in exact, logical sequence.³⁰

Throughout the various periods we have seen how Novalis made many allusions and references to show that he was familiar with the development of the physical sciences, and, what is more, he tried to solve problems, interesting and pertinent to himself, which grew out of the study of the sciences. In this last period, partial expression of all this found its way into poetry. Scientific theories turning the human mind to the vastness of time and space, and to the limitless possibilities in nature, as those in geology, astronomy, physics, and chemistry were doing, could but stir his imaginative fantasy to expression. Heinrich von Ofterdingen particularly is full of reflections of this interest. But even in this apotheosis of poetry, Novalis did not intend to allow the poet unrestrained freedom of fancy. He made Klingsohr speak of his intention to instruct the

30. Cf. Novalis' letters to Geh. Finanzrat von Oppel in December, 1799, and January, 1800; his letter to Bergrat Werner in April, 1800; also his remarks in answer to proposed changes made by Bergrat Senf, and his opinions concerning the manufacturing methods of the alum-works at Hohenebra--Novalis' Schriften (Kluckhohn), Bd.4, S.297 f., S.312 f., S.336 f., S.302 f., S.340 f. Cf. also "ein 'Extrakt' aus dem durch Oppel dem Kurfürsten erstatteten kommissarischen Bericht unterm 29. Juli 1799" in Samuel's "Der berufliche Werdegang Friedrich von Hardenbergs," S.97 f., and Novalis' "Bericht über die kommissarische Untersuchung des Ökonomieplans für die Saline Kösen," S.110 f.

young Heinrich in the mechanical routine and artisan-like rules of the art.³¹ There is necessary a great deal more than ecstasy to make a poet:

Nichts ist dem Dichter unentbehrlicher, als Einsicht in die Natur des Geschäfts, Bekanntschaft mit den Mitteln jeden Zweck zu erreichen, und Gegenwart des Geistes, nach Zeit und Umständen, die schicklichsten zu wählen. Begeisterung ohne Verstand ist unnütz und gefährlich, und der Dichter wird wenig Wunder tun können, wenn er selbst über Wunder erstaunt.³²

And he continues:

Ein reines offenes Gemüt, Gewandtheit im Nachdenken und Betrachten, und Geschicklichkeit alle seine Fähigkeiten in eine gegenseitig belebende Tätigkeit zu versetzen und darin zu erhalten, das sind die Erfordernisse unserer Kunst.³³

It is the poetic soul in Novalis finding expression when he speaks of the world as having been created, and the stars as having been joined together in melodious dance "durch wundervolle Sympathie."³⁴ It is the thorough investigator who writes:

31. Novalis' Schriften (Kluckhohn), Bd.1, S.186.

32. Ibid., S.185.

33. Ibid., S.186. In one of the later fragments Novalis has this to say about "poesie"---"Worin eigentlich das Wesen der Poesie bestehe, lässt sich schlechthin nicht bestimmen. Es ist unendlich zusammengesetzt und doch einfach. Schön, romantisch, harmonisch sind nur Teilausdrücke des Poetischen." (Schriften, Bd.3, S.342, 415.)

34. Ibid., Bd.1, S.126.

Ein jeder wird leicht an sich bemerken, dass er nur dasjenige deutlich und vollkommen beschreiben kann, was er genau kennt, dessen Teile, dessen Entstehung und Folge, dessen Zweck und Gebrauch ihm gegenwärtig sind: denn sonst wird keine Beschreibung, sondern ein verwirrtes Gemisch von unvollständigen Bemerkungen entstehn.³⁵

Novalis wanted to know about the origin of the world,³⁶ about the beginning of the stars, plants, animals and people, about the tremendous forces operating in nature, and finally about the very old "golden age." His geological studies helped him to realize this wish partially. In the second part of Heinrich von Ofterdingen he says:

Man sah in die Unermesslichkeit der Zeiten,
und erblickte die weitesten Geschichten in kleine
glänzende Minuten zusammengezogen, wenn man die
grauen Steine, die blitzähnlichen Risse, und die
hohen schaurigen Gestalten betrachtete.³⁷

35. Ibid., S.163.

36. In Die Lehrlinge zu Sais Novalis gives indication that he was aware of the various "theories of the earth" and the most recent explanations. Cf. Novalis' Schriften (Kluckhohn), Bd.1, S.15 f.: "Er versuchte den Knoten durch eine Art von Vereinigung zu lösen, indem er die ersten Anfänge zu festen, gestalteten Körperchen machte, die er jedoch über allen Begriff klein annahm, und nun aus diesem Staubmeere, aber freilich nicht ohne Beihülfe mitwirkender Gedankenwesen, anziehender und abstossender Kräfte, den ungeheuern Bau vollführen zu können meinte. Noch früher findet man, statt wissenschaftlicher Erklärungen, Märchen und Gedichte voll merkwürdiger bildlicher Züge, Menschen, Götter und Tiere als gemeinschaftliche Werkmeister, und hört auf die natürlichste Art die Entstehung der Welt beschreiben."

37. Novalis' Schriften (Kluckhohn), Bd.1, S.229.

It is the old miner who learns what is hidden in the hills, from where the water in the springs comes, where the gold and silver and precious stones are to be sought.³⁸ And it is he who can sing:

Der ist der Herr der Erde,
Wer ihre Tiefen misst;
Und jeglicher Beschwerde
In ihrem Schoss vergisst.

Wer ihrer Felsenglieder
Geheimen Bau versteht,
Und unverdrossen nieder
Zu ihrer Werkstatt geht.

.

Ihm folgen die Gewässer
Hülfreich den Berg hinauf,
Und alle Felsenschlösser
Tun ihr Schätz' ihm auf.....³⁹

The Graf von Hohenzollern speaks of the almost unknown, unexplored world underground as "ein grosses wunderbares Haus."⁴⁰ He is happy that some are beginning to inspect and investigate it more carefully.⁴¹ The "investigator" is climbing about over the hills, noting carefully the deep chasms, finding good signs,⁴² and reporting details exactly as in the following passage in which the cavern is described:

Der Boden war weich und ziemlich eben; die Wände sowie die Decke waren ebenfalls nicht rau und unregelmässig; aber was die Aufmerksamkeit aller vorzüglich beschäftigte, war die unzählige

38. Ibid., S.144.

39. Ibid., S.152 f.

40. Ibid., S.160.

41. Ibid.

42. Ibid., S.144 and 155.

Menge von Knochen und Zähnen, die den Boden bedeckten. Viele waren völlig erhalten, an andern sah man Spuren der Verwesung, und die, welche aus den Wänden hin und wieder hervorragten, schienen steinartig geworden zu sein. Die meisten waren von ungewöhnlicher Grösse und Stärke. Der Alte freute sich über diese Überbleibsel einer uralten Zeit;....⁴³

Novalis, however, could not stop here. "Eine interessante Gedankenreihe" had been started. These wide, dark halls appeared to be part of a strange subterranean kingdom. The old miner muses:

.....,Wie',.....,Wäre es möglich, dass unter unsern Füßen eine eigene Welt in einem ungeheuern Leben sich bewegte? dass unerhörte Geburten in den Festen der Erde ihr Wesen trieben, die das innere Feuer des dunkeln Schosses zu riesennässigen und geistesgewaltigen Gestalten auftriebe? Könnten dereinst diese schauerlichen Fremden, von der eindringenden Kälte hervorgetrieben, unter uns erscheinen, während vielleicht zu gleicher Zeit himmlische Gäste, lebendige, redende Kräfte der Gestirne über unsern Häuptern sichtbar würden? Sind diese Knochen Überreste ihrer Wanderungen nach der Oberfläche, oder Zeichen einer Flucht in die Tiefe?'.....⁴⁴

Even Die Hymnen an die Nacht voice the same belief of age-old life far down in the ground: "Ein alter Riese trug die selige Welt. Fest unter Bergen lagen die Ursöhne der Mutter Erde."⁴⁵ Goethe used a similar expression when he spoke of granite as "der älteste, festeste, tiefste, unerschütterlichste Sohn der Natur."⁴⁶

43. Ibid., S.157.

44. Ibid., S.158.

45. Ibid., S.60.

46. In his essay "Über den Granit," dated 1784, but not published until his posthumous papers of natural science content came out. In "Fragmente der letzten Jahre" Novalis makes a notation "Über die Zusammensetzung des Granits," but there seems to be no reason to connect this directly with Goethe.

Now a king dwells in this underground kingdom. It is "der König der Metalle," who, as it were, is imprisoned here in a stronghold, awaiting the miner with a radiant, friendly mien. Undergoing many dangers and hardships, the miner is breaking through the impregnable walls in order to bring the king up to see the light of day.⁴⁷ This world of stones and minerals is a living world for the attuned observer. Novalis speaks of the "dunkelblaue Felsen mit bunten Adern;"⁴⁸ he sees clear, glittering, ruby-red fruits hanging among the branches of silver, and the little trees stand upon a crystal background.⁴⁹ He looks back upon the times when:

Höhlen zusammenwuchsen und ungeheure Fluten
das Land bedeckten:.....gewaltsame, riesenmässige
Zeiten,.....das furchtbarste Gewitter, das ent=
setzlichste Erdbeben in unsern Tagen ist nur ein
schwacher Nachhall jener grausenvollen Geburts=
wehen.⁵⁰

Now there is closer understanding and more peaceful intercourse in nature. There is in all of nature a powerful urge toward a freer, but more harmonious state. In this more harmonious state the hidden treasure-chambers in the old and strange underground castles are being unearthed. And Novalis has joined in this work. It is the professional man, interested in mines and successful mining, who can enthusiastically exclaim as follows when he comes upon the activity surrounding producing mines:

Ich kann euch nicht sagen, wie herrlich mir
zumute ward, als ich von einem Hügel die Haufen
von Steinen erblickte, die mit grünen Gebüsch
durchwachsen waren, auf denen bretterne Hütten

47. Novalis' Schriften (Kluckhohn), Bd.1, S.147.

48. Ibid., S.103.

49. Ibid., S.167.

50. Ibid., S.166.

standen, und als ich aus dem Tal unten die Rauchwolken über den Wald heraufziehn sah. Ein fernes Getöse vermehrte meine Erwartungen, und mit unglaublicher Neugierde und voll stiller Andacht stand ich bald auf einem solchen Haufen, den man Halde nennt, vor den dunklen Tiefen, die im Innern der Hütten steil in den Berg hineinführten.....⁵¹

Throughout the seventeenth century the Copernican hypothesis remained a novel scientific formulation. Even poets were rather slow in accepting it. Milton, in "Paradise Lost," considered the motions of the heavenly bodies, but the following lines express his attitude:

.....What if the Sun
Be center to the World, and other Starrs
By his attractive vertue and their own
Incited, dance about him various rounds?
Their wandring course, now high, now low, then hid,
Progressive, retrograde, or standing still,
In six thou seest, and what if sev'nth to these
The Planet Earth, so steadfast though she seem,
Insensibly three different Motions move?
.....
Whether the Sun predominant in Heav'n
Rise on the Earth, or Earth rise on the Sun,
Hee from the East his flaming rode begin,
Or Shee from West her silent course advance
With inoffensive pace that spinning sleeps
On her soft Axle, while she paces Eev'n.
And bears thee soft with the smooth Air along,
Sollicit not thy thoughts with matters hid,
Leave them to God above, him serve and feare;.....⁵²

The end of the eighteenth century, however, saw the fundamental question as to the formation of the universe coming into the foreground. Erasmus Darwin

51. *Ibid.*, S.145.

52. Book VIII.

gives a detailed account of the birth of the earth, why it rotates on its axis, how it acquired spheroidal form, what the original nucleus of the earth consisted of, how the moon was born, how the planets burst forth, and so on.⁵³

The Klingsohr Märchen in Heinrich von Ofterdingen gives beautiful poetic expression to the stimulating astronomical conceptions which were gaining ground at the turn of the century. There were the countless stars in graceful groups, the stars moving in circles, sometimes slowly and sometimes rapidly, in constantly varying rhythms, but always in perfect harmony. Sometimes these silent wanderers were interlaced in intricate patterns, sometimes nicely arranged in groups, then again they might be dispersed like a ray of light into countless sparks. Like a comet the sword which is thrown through the open window flies through the air.⁵⁴

Die Sterne schwangen sich, bald langsam, bald schnell, in beständig veränderten Linien umher, und bildeten, nach dem Gange der Musik, die Figuren der Blätter auf das kunstreichste nach. Die Musik wechselte, wie die Bilder auf dem Tische, unaufhörlich, und so wunderbarlich und hart auch die Übergänge nicht selten waren, so schien doch nur ein einfaches Thema das Ganze zu verbinden. Mit einer unglaublichen Leichtigkeit flogen die Sterne den Bildern nach. Sie waren bald in einer grossen Verschlingung, bald wieder in einzelne Haufen schön geordnet, bald zerstäubte der lange Zug, wie ein Strahl, in unzählige Funken, bald kam durch immer wachsende kleinere Kreise und Muster wieder eine grosse, überraschende Figur zum Vorschein....⁵⁵

53. "The Economy of Vegetation," Cantos I and II.

54. Novalis' Schriften (Kluckhohn), Bd.1, S.196 f.

55. Ibid.

In the eyes of Novalis the celestial bodies are gleaming prophets. Perhaps they too played an important role in the old history of the underground structure of the earth. The old miner is speaking of them:

Man wird vielleicht sie aus ihren Werken, und ihre Werke aus ihnen mit der Zeit besser kennen und erklären lernen. Vielleicht zeigen die grossen Gebirgsketten die Spuren ihrer ehemaligen Strassen, und hatten selbst Lust, sich auf ihre eigne Hand zu nähren und ihren eigenen Gang am Himmel zu gehn. Manche hoben sich kühn genug, um auch Sterne zu werden, und müssen nun dafür die schöne grüne Bekleidung der niedrigeren Gegenden entbehren. Sie haben dafür nichts erhalten, als dass sie ihren Vätern das Wetter machen helfen, und Propheten für das tiefere Land sind, das sie bald schützen bald mit Ungewittern überschwemmen.⁵⁶

The possibilities suggested by the thought that mountain chains might be the traces of former paths of heavenly bodies are indicated in a short notation in the later "fragments." The note, "Richtung der Berge nach dem Mondslauf,"⁵⁷ points to the influence of the stars in the earth's development. Novalis had been considering the influence the mountains and their location have on climate and atmospheric conditions and their attractive force,⁵⁸ so they help "their fathers make the weather."

What this and other "attractive" forces are, was still holding Novalis' interest. According to what laws does a substance "choose" that which attracts it, and which chemical relationships are stronger, those easily formed and more easily dissolved, or those formed and dissolved with more

56. Ibid., S.165.

57. Ibid., Bd.3, S.305, 160.

58. Ibid., S.305, 158.

difficulty?⁵⁹ Such questions accompanied the still debated galvanism, magnetism,⁶⁰ electricity--and oxidation.⁶¹

It was during this period that Johann Wilhelm Ritter's friendship with Novalis grew very close. It was during the months when Novalis was taking care of exacting routine professional duties, that this friendship with the romantic and mystic physicist developed. Ritter had decided that galvanism must accompany all life and its processes, and possibly extend into inorganic nature too. He had come to the conviction that one theory should account for all nature-phenomena. Enthusiastically Novalis followed Ritter's thought, received deeper insight into the

59. *Ibid.*, S.301, 122.

60. References to the magnetic needle in *Die Lehrlinge zu Sais*--Novalis' *Schriften* (Kluckhohn), Bd.1, S.34: "Dankbar legt der Priester diese neue, erhabene Messkunst auf den Altar zu der magnetischen Nadel, die sich nie verirrt, und zahllose Schiffe auf dem pfadlosen Ozean zu bewohnten Küsten und den Häfen des Vaterlandes zurückführte." In *Heinrich von Ofterdingen*--Bd. 1, S. 198: "Auf einmal brachte der Vater ein zartes eisernes Stäbchen herein, das er im Hofe gefunden hatte. Der Schreiber besah es und drehte es mit vieler Lebhaftigkeit herum, und brachte bald heraus, dass es sich von selbst, in der Mitte an einem Faden aufgehängt, nach Norden drehe. Ginnistan nahm es auch in die Hand, bog es, drückte es, hauchte es an, und hatte ihm bald die Gestalt einer Schlange gegeben, die sich nun plötzlich in den Schwanz biss. Der Schreiber ward bald des Betrachtens überdrüssig. Er schrieb alles genau auf, und war sehr weitläufig über den Nutzen, den dieser Fund gewähren könne."

61. Oxidation took on its great importance, when it became certain that the luminous process of a burning flame was the same as that taking place in breathing. It became known what maintained the process of the burning flame, what helped sustain life a bit longer. Oxygen could to a certain extent be accepted as a life-giving element, the vital process be accepted as a chemical process.

general questions pertaining to natural science, and wrote the following fragment: "Der Galvanismus ist wohl weit allgemeiner, als selbst Ritter glaubt--und entweder ist alles Galvanismus oder nichts Galvanismus."⁶² Ritter's world of ideas was immense. He was a clear thinker and a careful investigator, even though Rudolf Haym and Henrik Steffens give somewhat destructive criticisms.⁶³ Cuvier's verdict was:

S'il n'eût pas été frappé d'une mort prématurée, il est probable qu'il aurait procuré aux sciences physiques des richesses tout aussi grandes que celles de Volta.⁶⁴

Ritter had tried to demonstrate that each part of a living animal body was to be looked upon as being a system of countless, infinitely small galvanic chains.⁶⁵ Based upon this theory, he advanced

62. Novalis' Schriften (Kluckhohn), Bd.3, S.304, 149.

63. (a) Die romantische Schule--S.673 f.--".....Nicht an Scharfsinn, nicht an Phantasie, sondern nur an strenger wissenschaftlicher Zucht, an geordneter Bildung fehlte es dem Autodidakten.....Noch in der Literaturübersicht des ersten Heftes der Europa (1803) stellte er [Friedrich Schlegel] ihn [Ritter] in eine bevorzugte Parallele zu Schelling und sprach törichterweise von dem Rigorismus der Methode des Mannes, der in Wahrheit ohne alle Methode war."
(b) Lebenserinnerungen aus dem Kreis der Romantik--S.109 f.--"Ich muss noch von einem in der Tat bedeutenden und seltsamen Menschen reden, dessen wunderbar verworrener Geist, in welchem Dunkelheit und scharfsinnige Klarheit dicht nebeneinander lagen, mich viel beschäftigte....."

64. Histoire des sciences naturelles--3. p., t.5., p. 69. Olshausen too pointed out that Haym's annihilating verdict, blindly followed for many years, was unjustified.

65. Beweis, dass ein beständiger Galvanismus den Lebensprozess in dem Thierreich begleite--"Ein jeder Theil des Körpers, so einfach er auch sey, ist demnach anzusehen, als ein System unendlich vieler unendlich kleiner Galvanischen Ketten, denn man kann theilen bis ins Unendliche, und immer noch werden Theile ähnlich (in dieser Rücksicht) dem Ganzen erscheinen....."--S. 158 f.

a hope that light might be thrown upon the influence that heat, light, and electricity have upon animal matter, upon the relationship between bodily and mental trouble, and upon the bond existing between body and soul. These hopes, Haym says, became intensified "zu den wunderlichsten Phantasien in dem magischen Idealismus Hardenbergs."⁶⁶ However, Haym does admit, that even though Novalis could revel in an unrestrained "Phantasieleben," it did not mar or destroy in him a normal mental life.⁶⁷ Novalis could appreciate Ritter's comment: "Man handelt überall aus Instinkt: Gründe sind klar gewordener Instinkt;"⁶⁸ he could see the value of hypotheses and intuition, and yet, he could be convinced

.....dass man durch kalten, technischen Verstand und ruhigen, moralischen Sinn eher zu wahren Offenbarungen gelangt, als durch Phantasie, die uns bloss ins Gespensterreich, diesen Antipoden des wahren Himmels zu leiten scheint.⁶⁹

There is always, as Haym says, the danger in a consideration of fragmentary material, that certain remarks and observations may be given a bearing and importance far beyond that intended by the author,⁷⁰ but the significant fact here is, that Novalis was aware of two viewpoints, and the conflict between the two. Sometimes the empirical, practical Novalis looked at life with observing, discerning eyes, then again at times the mystic poet might intuitively reach out for deeper understanding. In Die Lehrlinge zu

66. Die romantische Schule--S. 674. Bluth in his dissertation Philosophische Probleme in den Aphorismen Hardenbergs interprets Novalis' "magischer Idealismus" as being "nicht eine Zauberei persönlicher Willkür, sondern einen Ausdruck der kosmischen Harmonie."--p. 55.

67. Ibid., S.409 f.

68. Ibid., S.677.

69. Novalis' Schriften (Kluckhohn), Bd.3, S.332, 359.

70. Die romantische Schule--S.410.

Sais Novalis also presented the different attitudes of the time toward nature. The "Lehrlinge" discussed how one might observe nature, how one might approach it as an empirical investigator or as a philosophical observer.

When Ritter expanded and transferred his galvanistic theory into the realm of the spirit, Novalis could meet him on his own ground. It was just another attempt in the search for the soul of the universe. It was a universal characteristic of the age to be bent on a thorough understanding of nature. The dynamic character of unity, the acceptance of one fundamental "force" was dominating many minds of that period. Schelling and Franz v. Baader were propounding the same sort of theory. Of Ritter Novalis writes:

Ritter sucht durchaus die eigentliche Weltseele der Natur auf. Er will die sichtbaren und ponderablen Lettern lesen lernen und das Setzen der höhern geistigen Kräfte erklären. Alle äussre Prozesse sollen als Symbole und letzte Wirkungen innerer Prozesse begreiflich werden.....⁷¹

Just as Käte Hamburger⁷² has shown that Novalis' general remarks about mathematics cannot simply be dismissed as "wunderliche Behauptungen eines Zungenredners" as Rudolf Haym did,⁷³ so also Novalis' nature speculations are not speculations which find no basis in the thought and tendency of the time.

With Novalis' own severe illness in the fall of 1800 there came a renewal of the interest in Dr. John Brown and his medical theory. The "Tagebuch" of October, 1800, shows Novalis' intention of consulting

71. Novalis' Schriften (Kluckhohn), Bd.3, S.343, 422.

72. "Novalis und die Mathematik"—S.128.

73. Die romantische Schule—S.418 f.

with Dr. Weigel, and then of writing in detail to Dr. Röschlaub.⁷⁴ Both were students and followers of Dr. Brown and physicians of note. Once again a little further on, Novalis wrote that if matters got worse, he would go to Leipzig or Bamberg or Jena. There were outstanding medical men in all three cities, Dr. Röschlaub in Bamberg and Dr. Joh. Christian Stark⁷⁵ in Jena.

Novalis could still occupy himself with the idea of *sthenia* and *asthenia*, direct and indirect, which Brown had taken as the basic idea in his system of medical diagnosis.⁷⁶ Dr. Brown's idea of a universal medical theory based on excitability, could still start in Novalis' mind an interesting "Gedankenfolge." In "Fragmente der letzten Jahre" he wrote:

Es hat von jeher nur eine Krankheit, mithin nur eine Universalarznei gegeben. Mit der Sensibilität und ihren Organen, den Nerven, tritt Krankheit in die Natur. Es ist damit Freiheit, Willkür in die Natur gebracht und damit Sünde, Verstoss gegen den Willen der Natur, die Ursache alles Übels. Es gibt nur Muskelkrankheiten, die aus Nervendespotism entstehn. Der sittliche Mensch muss auch eine freie Natur haben, eine gegenstrebende, eine zu erziehende, eine eigentümliche Natur. Ist das tierische Leben ein phlogistischer Prozess, so sind alle Krankheiten antiphlogistische Prozesse, Störungen des Brennens. Ihre Mannigfaltigkeit zeugt gerade von ihrer Personalentstehung. Krankheit ist Zwist der Organe.

74. Novalis' Schriften (Kluckhohn), Bd.4, S.410.

75. (1753-1811); Professor of Medicine in Jena, Schiller's family-doctor; he had taken care of Sophie von Kühn; he published Handbuch zur Kenntniss und Heilung innerer Krankheiten des menschlichen Körpers in 1799.

76. Novalis' Schriften (Kluckhohn), Bd.3, S.343, 425; S. 344, 427.

Die allgemeine muss fast immer örtlich werden, sowie die örtliche notwendig in allgemeine übergeht.--
Vergänglichkeit, Gebrechlichkeit ist der Charakter der mit Geist verbundenen Natur. Er zeugt von der Tätigkeit und Universalität, von der erhabnen Personalität des Geistes.⁷⁷

Unity, dominance of a universal law, even before the turn of the century, was being sought in every phase of scientific thought. Physiological and anatomical investigation had brought this idea into the animal world rather early. It was assumed that the same fundamental plan of structure existed in all animal forms, that the same forces were at work too. Fundamental characteristics and functional activities were listed as such forces. Sensibility, irritability, and the reproductive forces were considered the most vital, to which were added forces of secretion and propulsion.⁷⁸ "Theories of life" were pointing to sensation and stimulation--irritability, sensibility, and excitability--as fundamental. Some investigators

77. Ibid., S.344 f., 429.

78. An investigator of nature by the name of Karl Friedr. Kielmaier (1765-1844) carried on an investigation concerning the relationship of these so-called fundamental forces. He pointed out that when, as in lower organisms, the reproductive force predominates, sensibility and irritability are slight, when, however, sensibility is highly developed, reproduction and irritability become less. Novalis had his Rede über die Verhältnisse der organischen Kräfte untereinander. Cf. Liste II, "Verzeichnis der Bücher, so sich auf der Stube des Salinenassessors von Hardenberg befinden"--Novalis' Schriften (Kluckhohn), Bd.4, S.476 f. Of the 133 titles in this list almost 100 suggest scientific content. 17 books indicate Novalis' interest in medicine and physiology, 35 have to do with his professional work, and there are listed about 50 books on various other phases of science.

recognized a vital force back of these sensorial powers, some did not.⁷⁹

Rudolf Haym points out that Schelling realized that a new era in the field of natural science had come on, that he wanted to be the first from a philosophical point of view to acknowledge this era, and to utilize the new results.⁸⁰ Haym recalls too, that during this period natural science did not yet scorn the aid of minds trained in other fields, and that amateurs in the field of natural science often attained high merit. He mentions Haller, Lichtenberg,⁸¹ Forster,⁸² and above all, Goethe.⁸³ Schelling did not hesitate to incorporate the newest discoveries in physics into his philosophical system. Friedrich Schlegel wrote to his brother inquiring whether it might not be advantageous to ask Schelling to write an account of physics for their periodical Das Athenäum.⁸⁴ Galvanistic discoveries had turned out

79. Johann Friedrich Blumenbach's physiological studies involved consideration of "the forces of life"--called "Bildungs=trieb"--which reside within matter and prepare that matter to receive stimulation. John Hunter in England considered organic matter as endowed with properties which become the cause of sensations. Life was something more than organized matter subjected to stimuli, he said. Humboldt spoke of "eine Lebenskraft" which was inherent in a living organism. As long as there was "life," the natural chemical relationships between substances were arrested. When this vital energy passed out of the organism, the substances became regulated according to their chemical nature.

80. Die romantische Schule--S.638.

81. G. Christ. Lichtenberg (1742-99); Physicist and satirist.

82. Georg Forster (1754-99).

83. Cf. Die romantische Schule--S.641 ff.

84. Ibid., S.672. In Schelling's "Einleitung zu dem Entwurf eines Systems der Naturphilosophie--Oder über den Begriff der spekulativen Physik und die innere Organisation eines Systems dieser Wissenschaft" (1799) one sub-division is entitled "Die Naturphilosophie ist spekulative Physik." Later in 1802,

to be an effervescent element in the whole field of physical science. Schelling's observation of nature was stimulated by Ritter's experiments. A dynamic-organic conception of nature was held by both, and by Novalis too.

Just as Coleridge under the influence of Schelling, later in life was interested, not so much in Ritter the young experimenting physicist, as in Ritter the naturalistic philosopher, so Novalis too during this last period felt strongly that the "soul" to comprehend the results of experiment is of high value. Coleridge in his essay The Theory of Life, defined life as "the principle of individuation." In all life there is a tendency to individuation. This tendency is perfected in man. In this tendency to individuate, however, there is always the opposite tendency to connect. Polarity is its "most general law," and this "most general law" could be demonstrated best at that time in science by the magnetic, electric, and chemical powers. The tendency to individuate, Coleridge said, combines with the action of these three powers, always present, but generally modified. These three forms of powers were the highest forms and most akin to life thus far discovered by science. Magnetism presented itself as reproduction, electricity as irritability, and chemical affinity as sensibility. These three powers were ever working together. The process, varying in the different modifications of life, was explained by Coleridge in the following way. Magnetism, he said, was "the power which works in length, and produces the first distinction between the indistinguishable by the generation of a line."⁸⁵ Surface power was electricity,

(Footnote continued)

in "Über das Verhältnis der Naturphilosophie zur Philosophie überhaupt" he explicitly separated speculative physics, which takes its fundamental principles from natural philosophy, from natural philosophy itself.

85. Coleridge's Works, "Miscellanies, Aesthetic and Literary; to which is added 'The Theory of Life.'"—p. 408.

and the chemical process acted in depth. As the intensity of individuation increased, the power of irritability and then sensibility increased, until in man the power of sensibility has reached its highest point. His summarizing closing remarks follow:

Life itself is neither of these [three powers] separately, but the copula of all three—..... Life, as Life, supposes a positive or universal principle in Nature, with a negative principle in every particular animal, the latter, or limitative power, constantly acting to individualize.....the former. Thus, then, Life itself is not a thing—a self-subsistent hypostasis—but an act and process;.....⁸⁶

In "Fragmente der letzten Jahre" Novalis approached somewhat the same conception. He said electricity "hat bloss auf Flächen Beziehung," that "Chemism aber auf Masse sich bezieht."⁸⁷ Then the following paragraph brings new thoughts:

Alle Pflanzen verstärken im tierischen Körper den organischen Bildungstrieb und die Reproduktionskraft; vielleicht dass sie daher in den Erscheinungen der herrschenden Sensibilität ein mittleres Produkt, verstärkte Irritabilität befördern. Tierische Speisen stärken die Irritabilität geradezu,⁸⁸ möchten aber bei zu hoher Sensibilität wegen der Neutralisation immer kein so wirksames Mittel zur Restauration der Irritabilität sein als Pflanzenteile. Noch wirksamer aber als Pflanzen, besonders bei verletzten Organen, werden Mineralsubstanzen sein, die den Bildungstrieb und den

86. *Ibid.*, p. 430.

87. Novalis' Schriften (Kluckhohn), Bd.3, S.338, 405.

88. Dr. John Brown had said too that "there is something in the animal matter which affords nourishing stimulus....."—

Cf. The Elements of Medicine of John Brown, p. 145.

Chemism anfachen und dadurch die Sensibilität noch kräftiger, selbst bis unter die Irritabilität herabbringen.⁸⁹

Somewhat further on in the same group of "fragments" we read: "Mit der Sensibilität wächst die Lebensdauer."⁹⁰ All of these comments point again to Novalis' attempt to understand "nature," to get at the meaning of life. He was still considering the "accepted" fundamental forces, their relationship to each other, and their possible relationship to life, or to a "vital" force.

Coleridge was following Schelling in this final idea of endless polarity in nature, while Novalis opposed Schelling and assumed an endless "drawing nearer" to the infinite, finally a passing over into another world. All Romanticists found any lack of unity unbearable. For Schelling a synthesis of nature and spirit, explained by his idea of individuation, sufficed. Novalis put stress upon the complete surrender of the individual to the cosmos. "Auf die Welt soll ich und will ich im Ganzen, nicht willkürlich wirken--dafür hab ich den Körper."⁹¹ The individual is to lose his individuality; the cosmos is to take on the life of the individual. This surrender of the individual is characterized by Novalis by means of symbolism: the holy communion, love, death. "Death" for Novalis was a privilege belonging to higher nature; it made possible a purification, a refining, a progressive "evolution" to higher life. He called death "ein Mittel zum Leben."⁹² In Heinrich von Ofterdingen the pilgrim asked the young girl who came to him: "Warst du schon einmal gestorben?" The reply was: "Wie könnt' ich denn leben?" Another question: "Wo gehn wir denn hin?"

89. Novalis' Schriften (Kluckhohn), Bd.3, S.338, 405.

90. Ibid., S.346, 431

91. Ibid., S.16, 10.

92. Ibid., Bd.2, S.349, 159.

was answered by her: "Immer nach Hause."⁹³ Poetic expression of what mortality meant to Novalis is found in one of the "Hymnen an die Nacht."

.....Ich fühle des Todes
Verjüngende Flut,
Zu Balsam und Äther
Verwandelt mein Blut—
Ich lebe bei Tage
Voll Glauben und Mut
Und sterbe die Nächte
In heiliger Glut.⁹⁴

We seem to recognize Novalis in the words of Joh. Wilh. Ritter in Fragmente aus dem Nachlasse eines jungen Physikers:

.....der Tod ist die Pforte des Lebens.....Mit verbundenen Augen führen unbekannte Hände uns den dunklen unterird'schen Gang durchs Leben.--Wir sind hindurch, es fällt die Binde, Gott in aller seiner Herrlichkeit steht vor uns, um uns, Sternen ähnlich, selig glänzend, scheinen wir uns selbst dem Gott des Himmels gleich geworden, und--dies nennt man Tod?—⁹⁵

93. Ibid., Bd.1, S.228 f.

94. Ibid., S.59.

95. Weltanschauung der Frühromantik (Deutsche Literatur--Sammlung literarischer Kunst-und-Kulturdenkmäler in Entwicklungsreihen--Reihe 17, Bd. 5)--S.73 f. Kluckhohn points out that the supposition, that Ritter actually incorporated some of Novalis' fragments in this collection, has become less plausible since new letters have been found.--Cf. "Einführung," S.10. The mutual stimulation as a result, however, appears to have been all the stronger then. A comparative study of Novalis' fragments and Ritter's Fragmente aus dem Nachlasse eines jungen Physikers should prove valuable. Thus far, however, not all the necessary material has been available to complete such an investigation, which, moreover, is beyond the limits set in this present study.

Novalis died on March 25, 1801, after "ein schnell vorübergehendes Dasein."⁹⁶ He has become, however, as Professor Kluckhohn says, "eine der Lebenspendenden Kräfte der deutschen Dichtung der Vergangenheit.....Seine Wirkung ist noch im Aufstieg."⁹⁷

96. Novalis' Schriften (Kluckhohn), Bd.1, S.226--Heinrich von Ofterdingen.

97. Ibid., S.80*.

CONCLUSION

It has become evident from this study that Friedrich von Hardenberg was interested in all the sciences of his time throughout his brief life, and that he knew as much about them as anyone did at that time. He was interested in all the developments that held the attention of scientific minds of that period. Novalis' world of thought is shown not to have been hostile to the scientific views of his day. Scientists and practical professional men acclaimed him.

Scientists of Novalis' day were beginning to realize more and more that candid, devoted scientific investigation found its strength and best progress in limitation. Nevertheless, at that time natural science had still a much closer interrelation with other sciences, and its connection with all intellectual culture was much more immediate than was possible later in the nineteenth century. The enormous amount of collected data made limitation and specialization imperative in the nineteenth century. The late eighteenth century was, however, still an age, as Rudolf Haym said, when poets and thinkers could confidently believe that they could make immediate application of the results in the field of natural science to the great stream of human progress.

To evaluate the "nature-philosophic" attempts of the Romantic mind, one must take into consideration the intuitively grasped connection of ideas and the interrelationship of all. An impersonal open-minded search for truth, which is the essence of science, must take into consideration the philosophic basis on which modern science is built. Our senses can

apprehend phenomena, but we do not know whether the conceptions of science represent lifelike pictures of any fundamental reality behind the phenomena. The study of such physical phenomena, including the cases in which the phenomena are connected with living organisms, is the field of natural or physical science. The narrow sense of the term, natural science, excludes any direct consideration of the mental or psychical facts in living organisms. Such exclusion can be a matter of convenience only. It cannot be universally accepted in connection with the group of biological sciences, for the mental side of life cannot be relegated to a place outside nature; there can be no ultimate barrier between the physical and the psychical. The scientific investigator in the field of natural science, gives only an incomplete conception of the world, if he ignores the biological standpoint, from which phenomena are regarded in their bearing on life, and the psychological standpoint, from which they are studied in relation to mind. The fundamental question is, whether it is possible to represent the physical world, uninfluenced by the psychical world. Recognition of distinct limitations in the scope of purely scientific theories has at the present time again lessened the feeling of hostility towards the more intuitional modes of apprehending knowledge.

The more intuitional modes of arriving at truth are generally attributed to philosophical and poetical thinkers. The years 1790 to 1810 saw an outstanding group of philosophical and poetical thinkers in Germany, among them the so-called "Early German Romanticists." This group, confronted with the mystery of the universe, questioned the ultimate nature of reality. They were not willing to confine their attention to the phenomena which our senses apprehend, thus restricting their inquiry. They went beyond the bounds of natural science. The term "Natural philosophy" survives to remind us of their

attempts. However, when the results of natural science are supplemented by ontological assumptions, it does not necessarily mean that the investigator does not fully realize the true value of scientific observations. It may mean that he intuitively seeks to go deeper, to proceed into realms not investigated by the purely scientific worker.

Jakob Minor, one of the editors of Novalis' Schriften, many years ago said that the poet's fragmentary work would undoubtedly continue to occupy the minds of many investigators for a long time, since the range of the poet's interests was so extensive. The philosopher Schelling had felt repelled by what he called the flippant, superficially expressed attitude in the fragments, of which Novalis considered only a very few as ready for publication. This severe criticism came to be applied to Novalis' studies in the field of natural science in general.

Because of the additional available material, and because of the chronological arrangement of all fragmentary material, it has become possible to trace the development of Novalis' attitude toward the natural sciences of his time. It was a general development away from the theoretical to practical application. Novalis' practical life as director of the salt-works and mines shows that he could apply his scientific studies in successful vocational activity. He always considered his poetic work as work of secondary importance. His best creative work was done in odd moments during the last years of his life, when his days were full of responsibilities and concerns in connection with his technical work, and when practical plans and improvements in apparent profusion were coming from his mind.

Throughout the four periods into which Novalis' life has been divided in this study, we see a continuing interest in the development of the

physical sciences. All along we feel that the young man was following the new discoveries and hypotheses with a keen, alert mind. Always there is evident in Novalis' comments his way of independently developing any idea which roused his interest, though there was a general tendency away from the purely theoretical to the practical.

Novalis kept his interest in physiological and anatomical studies to the very last. His interest in medical science was strong when he went to Freiberg. He became aware of the comparatively backward attitude of many medical men of that period and became rather critical of them. The Brunonian theory, however, always remained stimulating for him.

In the science of mining, his practical development was carried further than in any other field. Halurgy and metallurgy were most important for his immediate practical work. But geology and mineralogy in general held his attention. Novalis was aware of the extensive geological research which had resulted from the theory of uniformitarianism advanced by Hutton. Novalis at first admitted that water was a primary means in the formation of the earth's surface. The idea of "revolutions," however, gained consideration. If the earth was estimated as being only six thousand years old, he could but conclude that the earliest revolutions must have been "great and violent."

Novalis at first was interested in all the speculations concerning galvanistic, magnetic, and electrical phenomena, and their relationship to chemical reactions and to experiments in physics. He realized the importance of all the involved investigations for the question as to the relationship of organic and inorganic matter. During the last years of Novalis' life, however, the physical and chemical phenomena having possible connections with his mining interests, were primarily emphasized.

Astronomy for Novalis was a close link with the infinite. The immense heavenly bodies and their "life" held him in awe. He saw them as gleaming prophets who played an important role in the history of the earth, but he also realized how important the progress in the field of astronomical investigation was for all the physical sciences, just as he foresaw the value of pure mathematics and mathematical methods for later development in the whole field of natural science.

Proof of significant creative work in science is not necessary to show that Novalis had an understanding of the scientific questions of his time. The significant point is that this poet realized how much the men of science were making the senses aware of, and then tried to show that in all things perceived there is a manifestation of an existence transcending mere physical phenomena. Looked at in the light of his own time, Novalis' development of ideas is not strange. The severe critics are unjust when they approach a study of Novalis and his relationship to science from the standpoint of any other time. Novalis showed himself perfectly capable of grasping and understanding the importance of the attitude toward the external nature-world, which was developing during the last decades of the eighteenth century. What is more, he approached our present attitude toward "natural science."

E. W. Hobson, in his book The Domain of Natural Science, points out that natural science has at various times been in contact with various systems of metaphysical thought, and that ontological assumptions have played a large part in the history of science. The important question then is

.....how far such assumptions are indispensable for the existence and efficiency of Natural Science as an organized system devised

for the systematic ordering of our physical percepts, in whatever degree experience may show that this ordering is possible.¹

Hobson, however, continues and emphasizes the fact that

.....any further influence which Natural Science may have upon general views of the world depends upon the nature of any ontological hypotheses or postulations which may be made in attempts to explore the nature of reality, but which go beyond any assumptions which Natural Science itself needs.²

Novalis thought very much as Hobson does, meta-physical assumptions must enter in, if natural science is to influence universal views of nature as a whole. An expansion of thought beyond the limiting boundaries of natural science does not therefore exclude an understanding conception of what pure scientific experiment and investigation entails. Possibly such an attitude makes the pursuit of "knowledge" more difficult, but certainly it must be richer and deeper. Natural science in the nineteenth century piled up, as W. Bölsche in his article, "Novalis und das neunzehnte Jahrhundert," says, "unschätzbare neue Bausteine zu einer einheitlichen Weltansicht,"³ but a philosophical understanding and application of this material was at the end of the century just barely beginning to be made. So it is truly remarkable that Novalis at the beginning of that century could manifest a conception, intuitive though it might have been, of what all this investigation in the field of natural science could lead to. It is true that much which he wrote is unfinished, immature, youthful, but his writings are

1. p. 51 f.

2. p. 470 f.

3. p. 191.

all those of a mere youth too, and yet there is understanding and developed thought in much that he wrote.

Professor Arthur H. Compton, world-famous physicist, in his "Preface" to The Freedom of Man describes himself as trying "to relate his findings to other fields of human interest."⁴ He continues:

.....science represents but one aspect of human experience. I find myself unsatisfied without at least a careful attempt to relate the various aspects of experience with each other in my own mind, thus formulating a philosophy which I can use for guiding my own life.....In preparing these lectures I have been strongly impressed by the way in which science can be interpreted to give a moral and ethical outlook closely parallel with that taught by the highest types of religion.⁵ The language and the mode of thought are different, but the correspondence between their conclusions is close.⁶ Far from being in conflict, science, as Dean Inge has remarked, has become an ally of religion. By increased knowledge of nature we become better acquainted with the God of nature, and with the part we have to play in his cosmic drama.⁷

4. p. ix.

5. Such a statement as that made by Novalis in a letter to Friedrich Schlegel does not then seem so very strange at all: ".....In meiner Philosophie des täglichen Lebens bin ich auf die Idee einer moralischen (im Hemsterhuisischen Sinn) Astronomie gekommen und habe die interessante Entdeckung der Religion des sichtbaren Weltalls gemacht."--Novalis' Schriften (Kluckhohn), Bd.4, S.232.

6. Through science we learn the laws of nature, adapt our lives accordingly, and nature can no longer be our enemy. The Old Testament says: "All things work together for good for him who serves the Lord," but for the one who does not adapt himself: "The wages of sin is death." (Cf. The Freedom of Man--p. 113 f.)

7. The Freedom of Man--p. ix ff.

One reason why the Romanticists turned back to the Middle Ages, was, that they felt that period to have been a time when faith, reason, superstition, and scientific knowledge were not yet differentiated, a time when the genius of poetry and the genius of science were not enemies.⁸ There must be poetry in nature to touch the human spirit. The article on Poetry in the Encyclopaedia Britannica says that facts have no place in poetry until they are brought into relation to a human soul. And Matthew Arnold has said that

poetry attaches its emotion to the idea;
the idea is the fact.....we have to turn to
poetry to interpret life for us, to console us,
to sustain us. Without poetry, our science will
appear incomplete;.....⁹

Very similar is Novalis' statement in "Das allgemeine Brouillon:"

Eine Wissenschaft ist vollendet, 1. wenn sie auf alles angewandt ist--2. wenn alles auf sie angewandt ist--3. wenn sie, als absolute Totalität, als Universum betrachtet sich selbst als absolutes Individuum mit allen übrigen Wissenschaften und Künsten, als relativen Individuen, untergeordnet wird.¹⁰

Novalis, whom Maurice Maeterlinck called "a scientific mystic,"¹¹ once wrote: "Wissenschaft ist nur eine Hälfte. Glauben ist die andre."¹² Science is of value if it leads to what might be called a satisfactory life-philosophy.

8. Using here Coleridge's distinction, that the real antithesis of poetry is not prose, but science.

9. "The Study of Poetry"—Essays in Criticism (Second Series)—p. 1 f.

10. Novalis' Schriften (Kluckhohn), Bd.3, S.89, 179.

11. On Emerson and Other Essays—p. 83.

12. Novalis' Schriften (Kluckhohn), Bd.2, S.217.

Alles muss Lebensmittel werden.....
Vom Glauben hängt die Welt ab. Glauben
und Vorurteil ist eins. Wie ich eine Sache
annehme, so ist sie für mich.¹³

Professor Compton's words are very similar:

I find myself unsatisfied without at least
a careful attempt to relate the various aspects
of experience with each other in my own mind,
thus formulating a philosophy which I can use
for guiding my own life.¹⁴

Both Novalis and Professor Compton in their
own respective ways, I believe, were giving ex-
pression to a belief in the validity of imagination,
intuition, faith, and the feeling heart of man. Both
were trying to gain understanding of the whole of
the spiritual, as well as the physical world. For
Novalis "die höhere Physik" was to serve as "eine
Dechiffrierkunst," to decipher the meaning of the
material world, its form, the mechanical movements,
the driving forces back of all. It is true that a
poetic imagination, and what is more, a mystic belief
also, colored Novalis' scientific studies. It is,
however, also true that sincere appreciation of what
scientific investigation really means, can lead to a
strengthened belief in intuition, faith, and "soul."

There were other Romanticists who took some
interest in science. It was a favorite subject of
the times. Novalis, however, as this study attempts
to show, was no mere dilettant. He became a pro-
fessional and an administrator. He stood out as a
practical man in his mining work. Novalis, too, as
other "Romanticists,"¹⁵ had a natural disinclination

13. Ibid., S.349, 159-161.

14. The Freedom of Man—p. ix ff.

15. Using the term "Romanticist" here, as a general term to
designate a type of character constantly recurring.

toward the dullness and routine of a profession. It was, however, not only because his father wished him to prepare himself for a practical occupation, and because Schiller had advised it, that he did so. There was in Novalis a healthy attitude of mind and an inherent bent toward activity which, together with a realization of what benefit work could give, determined him to take up a practical occupation. He had within himself the strength to control and direct his sensitiveness and his imaginative tendency. There was in his make-up something of delicacy and gentleness, but there was also much of solidity and resoluteness of character. He believed that reason must control fantasy. He was, moreover, aware of the fact that only conscious effort could maintain a balance between the two. As has often been pointed out, he alone of his Romantic contemporaries, with the exception of Schleiermacher, was able to maintain such a balance.

Novalis' interest in the natural sciences, their practical application, and their possible ontological implications, show this duality of his nature, and his control of it. He could carry on his every-day work which had to do with the exterior of things, but in the midst of all his practical activity he could discern something that pushed deeper into life's complexity. Then he could become what he wanted to be, "ein Magier," creating his own world, changing the ordinary into gold, reaching from this "real" world into the "unreal."

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